ELECTRICAL TIMES

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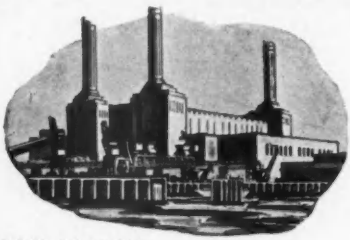
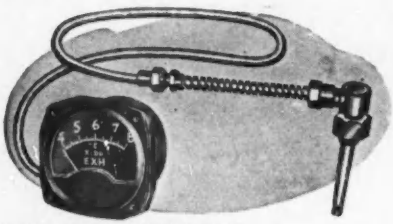


POWER STATIONS



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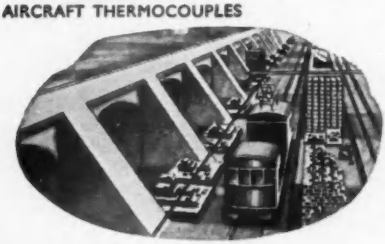

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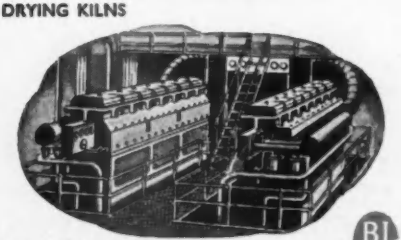

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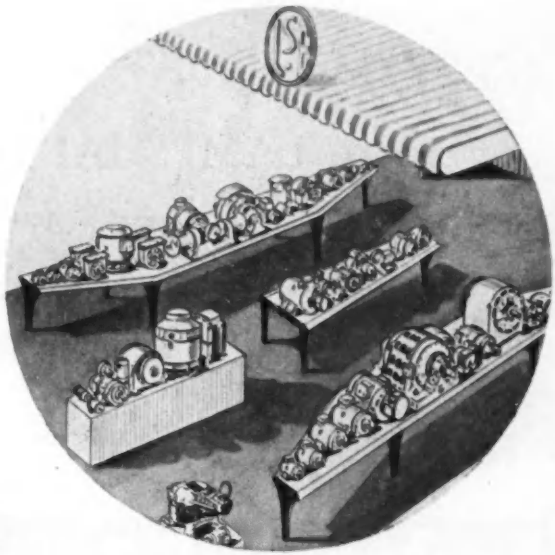

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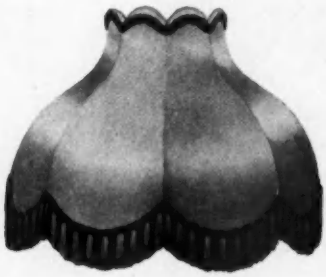

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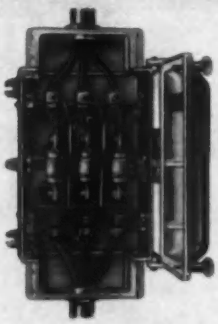

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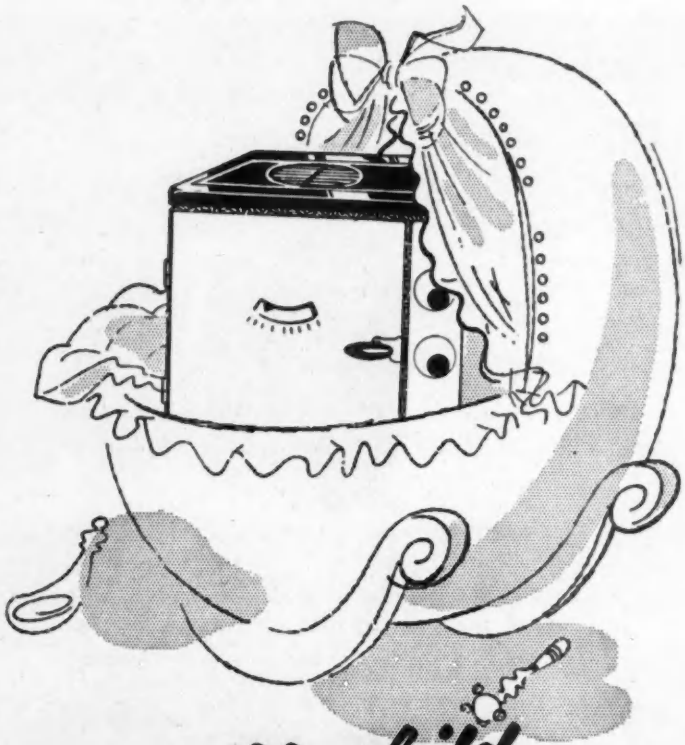

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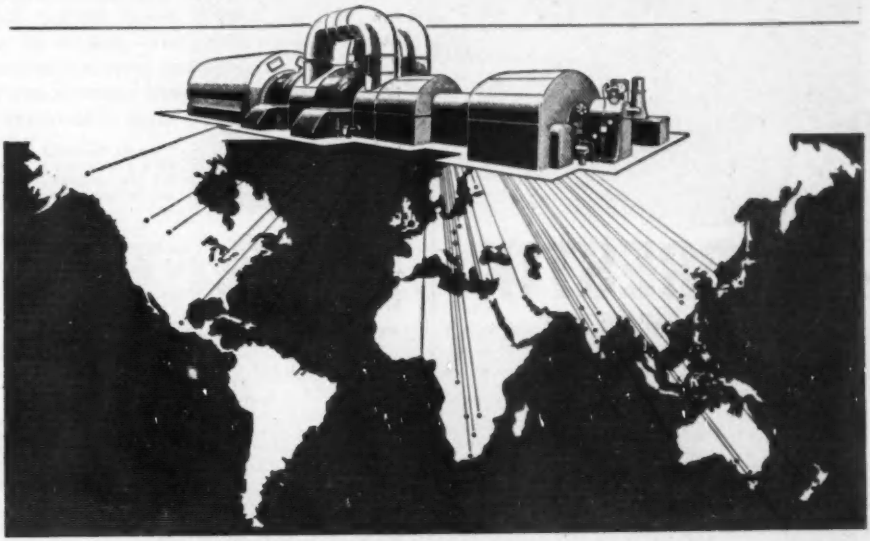

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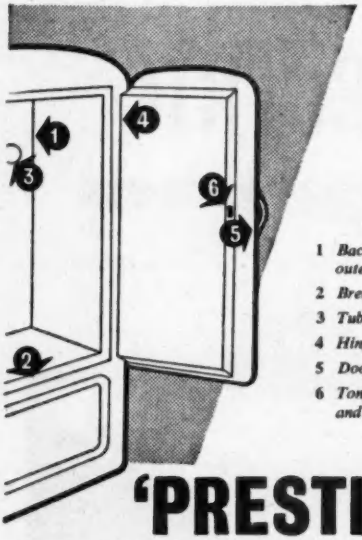

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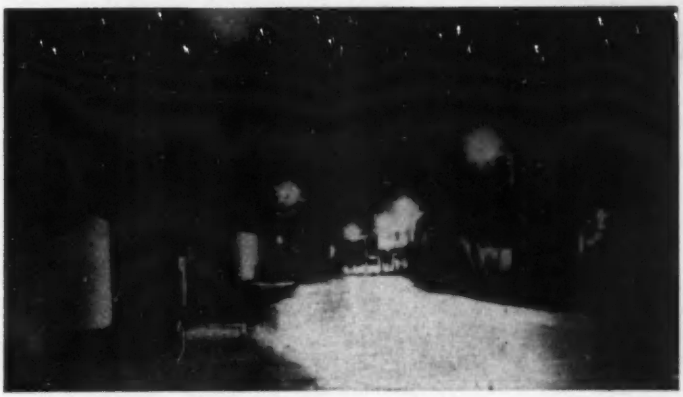

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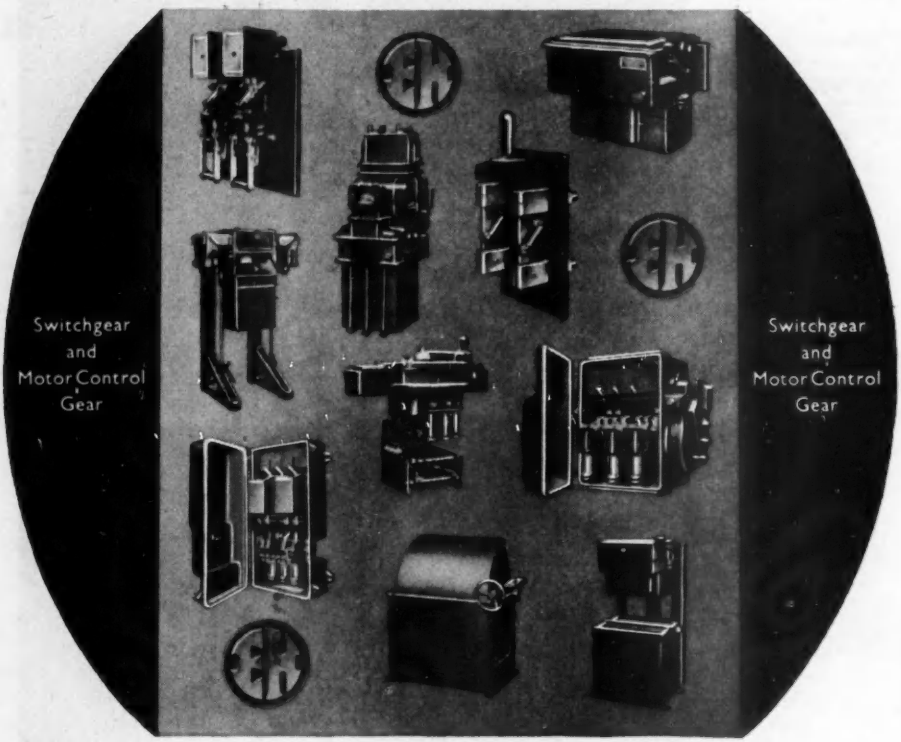

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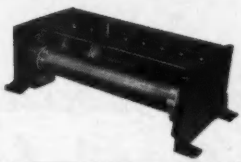

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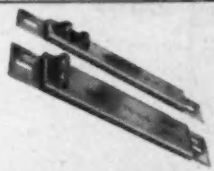

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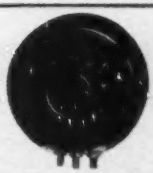

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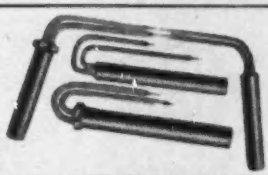

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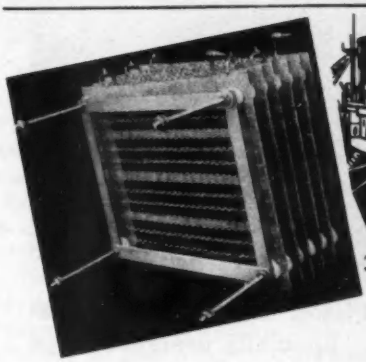

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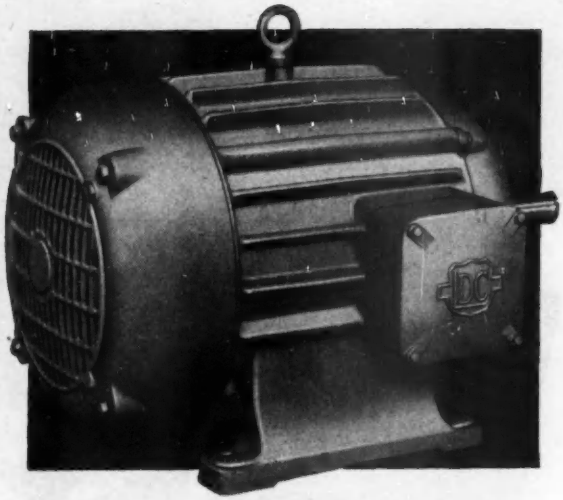

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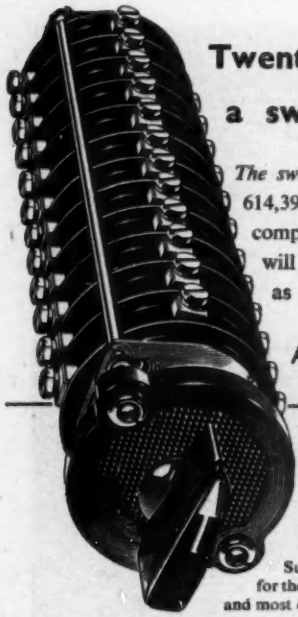

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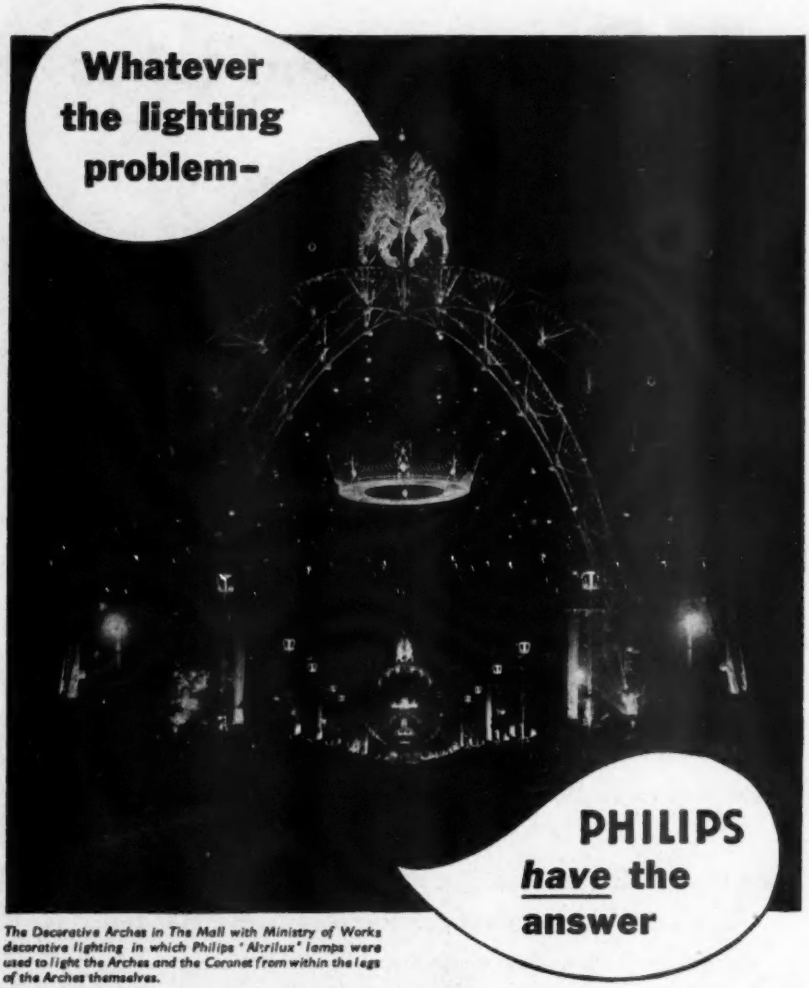

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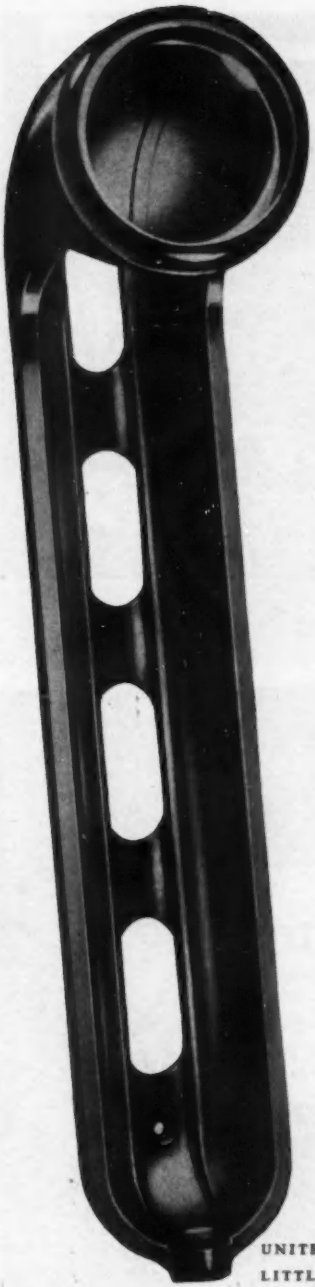
Shell research people are constantly experimenting to find even better lubricants for use in gears. For specialised wear study, four-ball and two-ball machines simulate ingeniously the combined rolling-sliding motion that occurs in gear tooth engagement.

In another machine spinning bronze discs in loaded contact give an accurate representation of wear on gears in actual service. Speed, direction of rotation and diameter of the discs can be varied to allow for the wide variety of conditions found in practice.

What happens to oils in high-speed gears? That problem is studied at Thornton in gear rigs which turn at up to 15,000 r.p.m.

Shell research is not a rapid process because any one result has to be tested again and again, in theory and practice, before it is allowed to stand. The Shell Lubricant in *your* gears is the result of this kind of research-in-depth.

SHELL LEADERSHIP IN LUBRICATION



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You wonder whether something can be moulded? Or you're convinced that it can't be? Ask Lorival. They'll do it if it is at all practicable. Moreover, they'll do it with unsurpassed polish. And their service is first-rate: pleasing design, keen prices, and rapid delivery. Leave it to Lorival.

In this case EBONITE was selected as the most suitable material for this Billiards Pocket for E. J. Riley Ltd., because of its strength and shock-resisting qualities. Original tool design enables the pocket to be moulded in one piece, including the undercut ring and elbow. Soft rubber strips on the bend of the elbow, and a soft rubber pad at the end of the channel section minimise noise in service.

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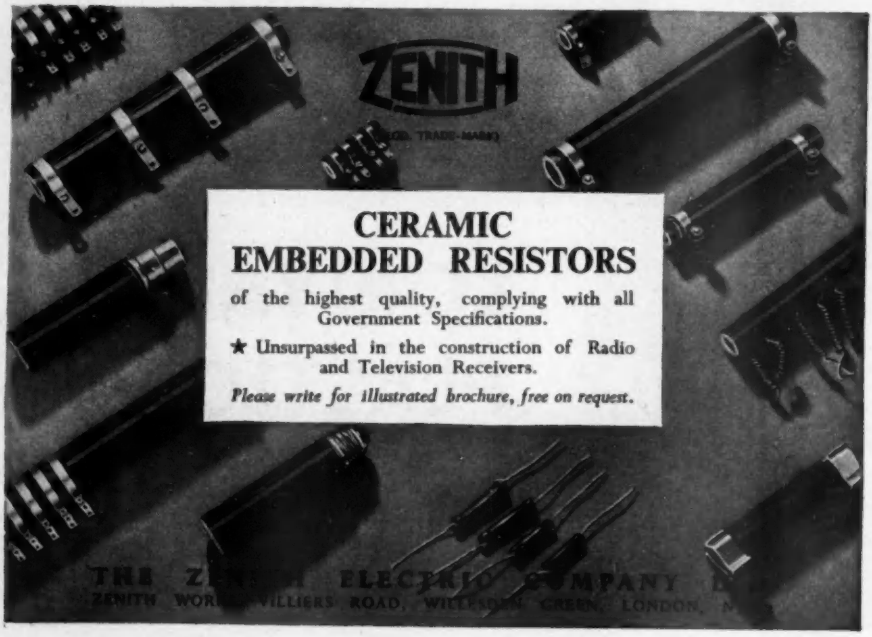
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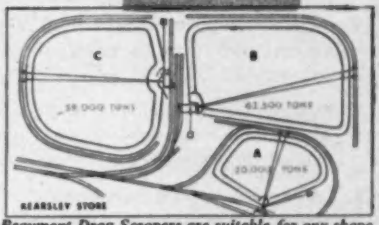
Storage Problem Solved—at Kearsley

...with Beaumont Drag Scrapers

The areas available for coal storage at Kearsley Power Station are of irregular shape, as at so many other stations, but with the Beaumont Drag Scraper system they are used to the fullest advantage. Two Beaumont Drag Scrapers were installed initially for areas A and B, aggregating 82,500 tons of coal. Each plant is under the direct control of only one man.

Further extensions at Kearsley call for a still greater stocking area, and Beaumont Drag Scraper equipment has again been specified.

Write now for further details of Beaumont equipment



Beaumont Drag Scrapers are suitable for any shape or size of storage area. Maintenance and running costs are low and unskilled labour may be used.

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INTERNATIONAL COMBUSTION LIMITED

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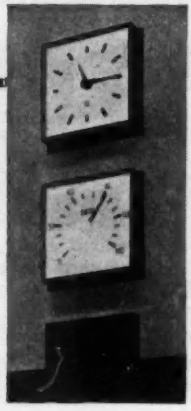
LOAD INDICATORS AND TELEMETERING EQUIPMENT

1

Everett Edgcumbe design and make Summation and Telemetering Equipment for load and other indications.

Each scheme is individually engineered and the method used, either electronic or electro-mechanical, is chosen to suit circumstances.

2



3

The illustrations show some typical remote indicators—they may be either direct or Servo operated.

1. 40-in. diameter illuminated double-sided summation indicator with remote controlled impending load pointer.
2. Turbine Room load indicator and clock in 4 ft square illuminated cases.
3. 4 ft square double-sided illuminated total load indicator.

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Makers of Electrical Instruments for indicating, recording and controlling; photometric apparatus; process controls.

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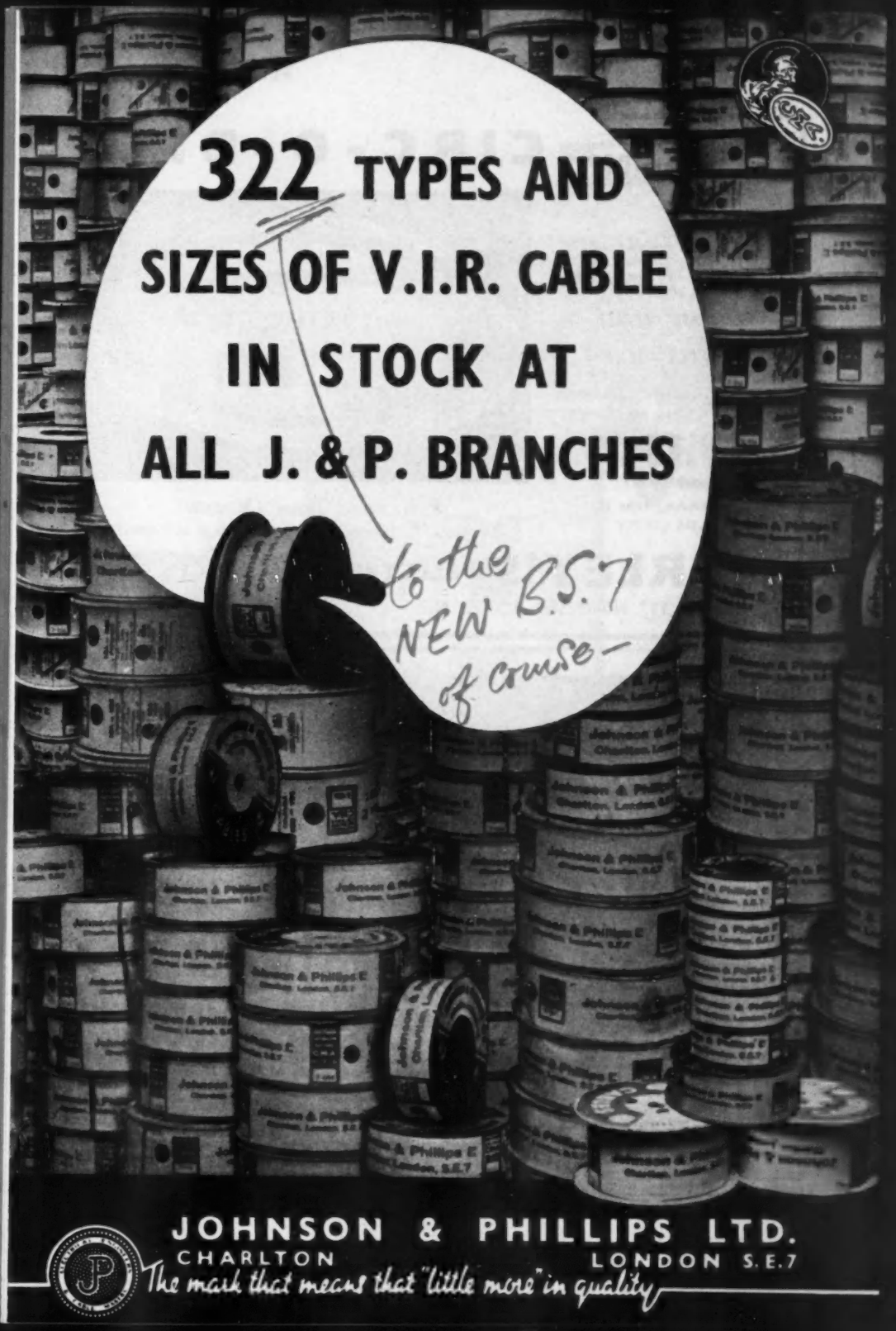
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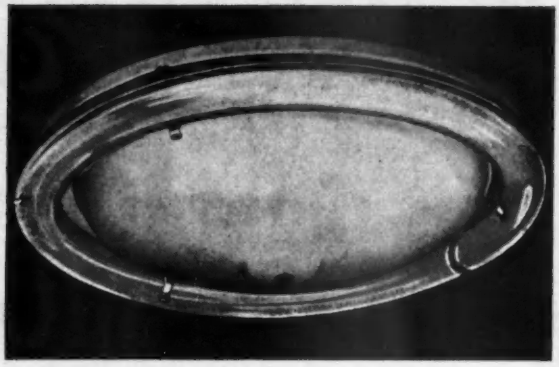

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DIRECT-ON-LINE AUTOMATIC CONTACTOR STARTER

A complete range of **Motor Control Gear** in individual or group arrangements in single, double or triple tier formation up to 650 volts A.C.

- **Interlocked Isolation**
- **Maximum Accessibility**
- **Swing-out Interior**
- **Magnetic Overload Relays**
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TYPE B *Relays*

The Type BRP relay, one of the Type B group of relays, is designed to give instantaneous reverse power protection to generators, transformers and rotary convertors, and to limit the interchange of power between interconnected supply systems. Highly efficient, simple and versatile, of high sensitivity, high torque and low consumption. Available in single, double and triple pole units in projecting or flush mounting cases.

Fully described and illustrated in Catalogue Section 7104, which is obtainable on request.

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Control-panels for power-stations

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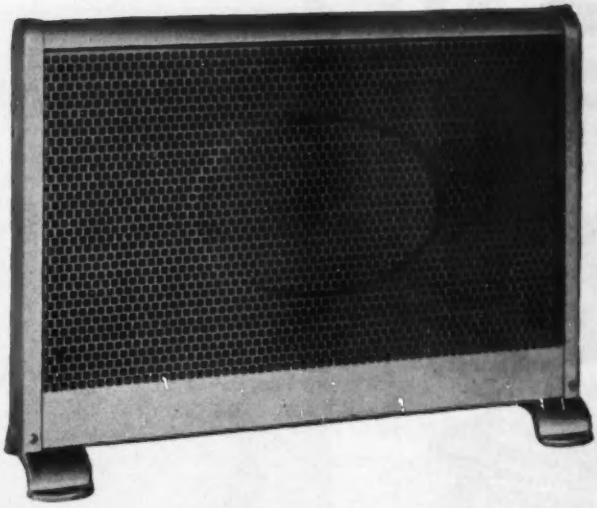
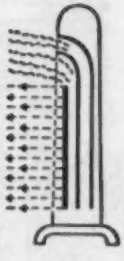


Berry's RAYDAIR HEATER

REGD. DESIGN PATS. PENDING.

DESIGN The RAYDAIR Heater is a low temperature radiator to which the convection principle has been added in order to eliminate wasteful rearward radiation.

The element is specially constructed to radiate the maximum heat from the front surface, while an air intake at the base of the unit provides free-draught convection to carry the heat from the back surface upwards through the louvres. It is this feature which warms the room more quickly. The initial rise in room temperature achieved by the RAYDAIR Heater is very rapid in comparison with a non-convection radiator.



PRICE The RAYDAIR Heater is made in 1 kW., 1½ kW., and 2 kW. sizes. It is equipped with a thermostat and pilot light and finished in Peach Bronze, Penny Bronze or Warm Silver. (Special finishes 5% extra.) By virtue of its advanced design it is possible to introduce the RAYDAIR Heater at these very competitive prices:—

1 kW	**£9.15.0**
1½ kW	**£13.17.6**
2 kW	**£20.5.0**

Illustrated booklets are available from:—

BERRY'S ELECTRIC LTD.

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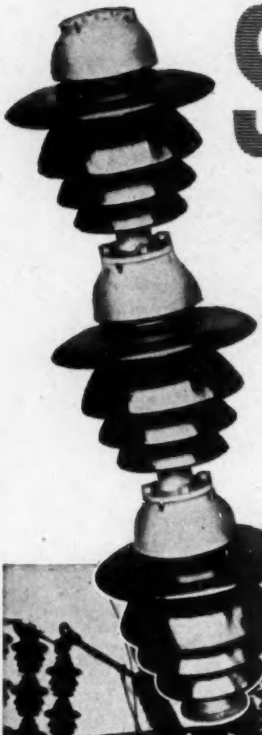
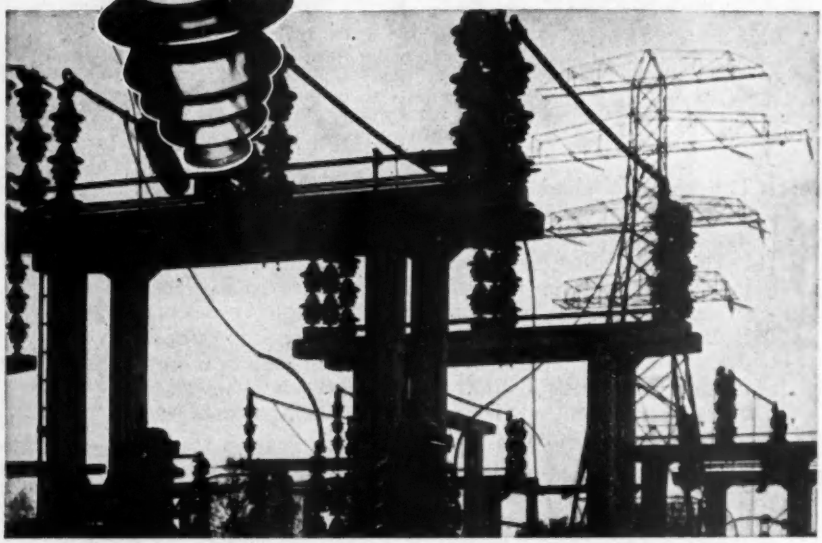


S.P.P.

INSULATORS IN SERVICE

Post Insulators in Northern Ireland

(Photograph reproduced by courtesy of the main contractors, Messrs. A. Reyrolle & Co., Limited.)



The 110 kV. sub-station at Drumnakelly is one of the many similar stations on the Ballylumford Scheme, Northern Ireland, equipped with S.P.P. posts of 3 units P.643.

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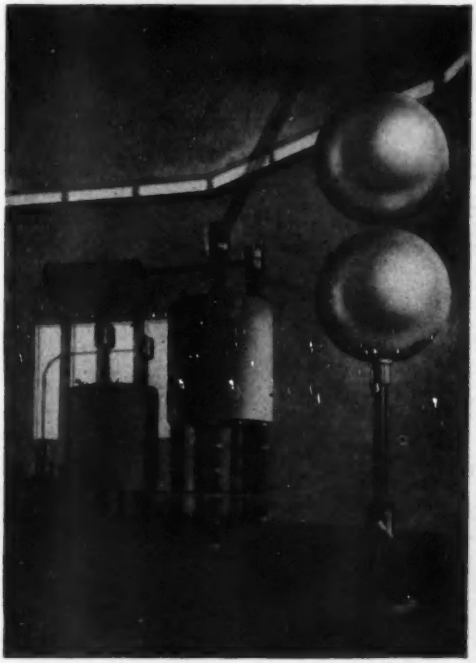
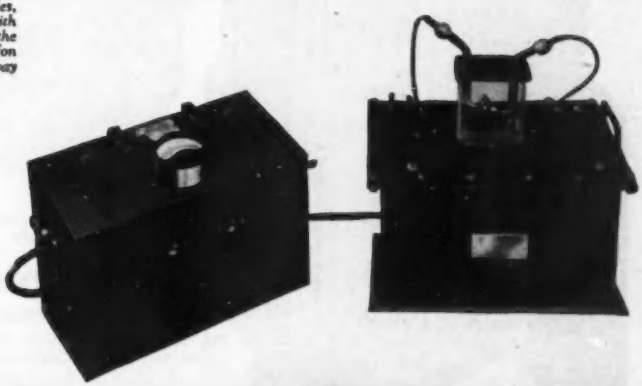
FERRANTI

High Voltage Testing Equipment



A 600 kV, 1,200 kVA, 50 cycles, Ferranti A.C. Testing Equipment with 1,500 mm. Sphere Gap installed at the Research Laboratory of Standard Telefon og Kabelfabrik A/S, Oslo, Norway in 1951.

Ferranti are specialists in the manufacture of A.C. and D.C. equipments which are designed to meet any requirement for both standard and research testing. Backed by 70 years experience in the development and manufacture of electrical apparatus.



Ferranti Oil Testing Equipment specifically designed for testing Insulating Oil for electrical strength in accordance with B.S.S. 148-1951.

FERRANTI LTD. Head Office and Works, **HOLLINWOOD LANCS.**

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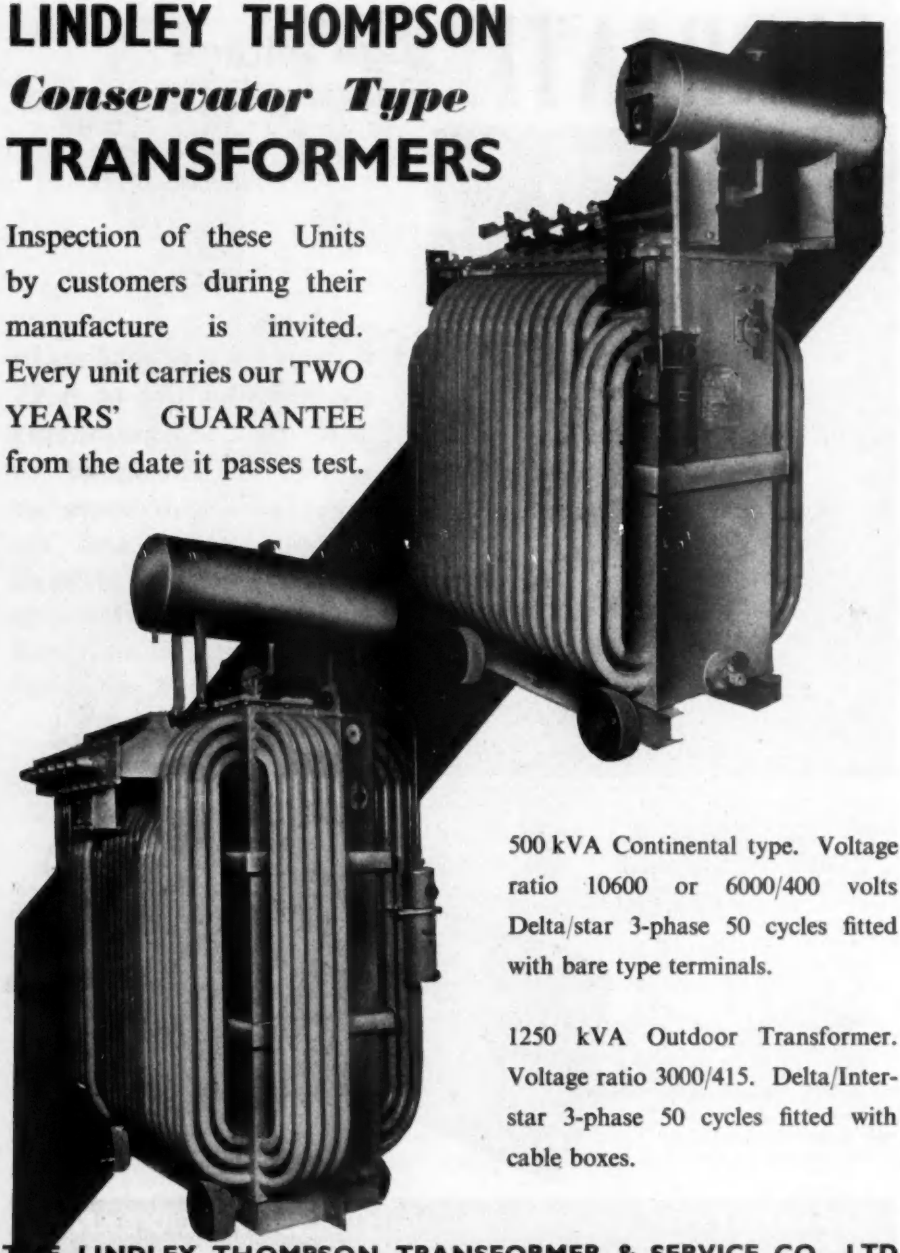
Conservator Type TRANSFORMERS

Inspection of these Units by customers during their manufacture is invited. Every unit carries our TWO YEARS' GUARANTEE from the date it passes test.



500 kVA Continental type. Voltage ratio 10600 or 6000/400 volts Delta/star 3-phase 50 cycles fitted with bare type terminals.

1250 kVA Outdoor Transformer. Voltage ratio 3000/415. Delta/Inter-star 3-phase 50 cycles fitted with cable boxes.

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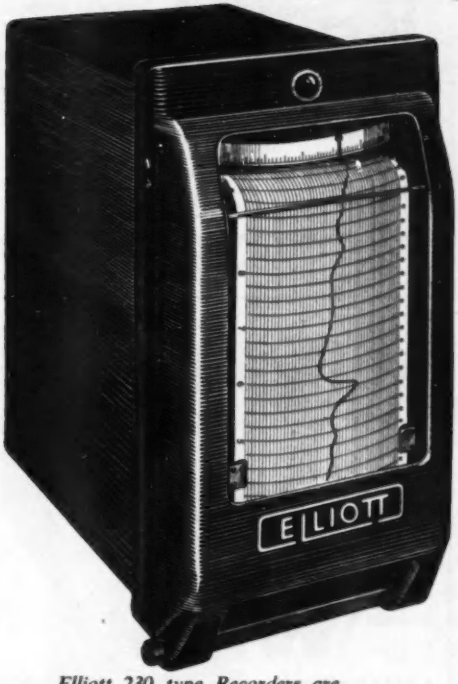
Electrical recording and measuring instruments



Elliott 230 type Recorders are fitted with 3" continuous charts.

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A moving coil instrument of robust, compact construction, extensively used by the General Post Office, British Electricity Authority and other undertakings throughout the world. Available also in portable form (weight only 24 lb.) Adjustable maximum and minimum contacts can be fitted for operating alarms and regulating units.

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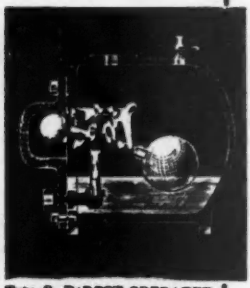

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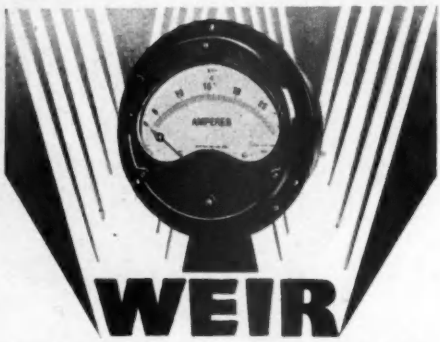

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Moving Iron, Moving Coil, Rectifier Types, Switchboard, Miniature, Controller, Portable

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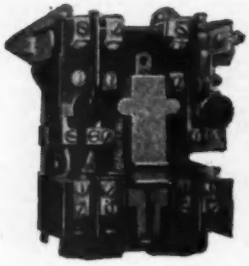
A. C. Direct-on-line CONTACTOR STARTER Type DOC71

for single-phase or poly-phase non-reversing squirrel-cage induction motors.

This new starter is elegant in appearance, sturdy in construction, and dependable in operation. It is available for motors up to 5 horsepower, and complies with BS.587 for "Frequent Duty", i.e. forty starts per hour.



The starter, comprising a triple-pole contactor with normally-open auxiliary switch and triple-pole hand-reset thermal overload relay, is enclosed in a distinctive die-cast aluminium case with integral START-STOP push buttons.

Up to 5 h.p. 200-550 volts
25-60 cycles

Member of the AEI group of companies

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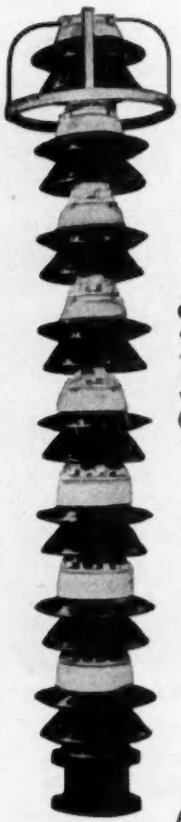

275 kV POST INSULATOR for the NEW BRITISH SUPER GRID ....

Overall height 9' 8" (2.95 m)

Approximate weight 1,000 lbs. (455 kg)

The result of extensive tests and research.. T.T. insulation takes another step forward.

In front as usual, Taylor Tunnicliff are ready to make another contribution to the NEW 275 kV Super Grid soon to take its place in the electrical supply organisation of Great Britain. Meticulous research, exhaustive and rigorous tests, skilful craftsmanship and long manufacturing experience put this latest product of the Taylor Tunnicliff organisation at the top of its class.

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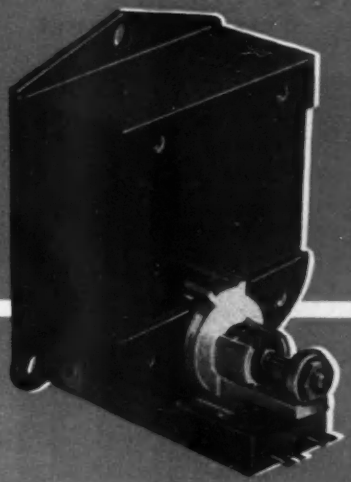

FOR the integration of minute voltages on a time basis; for converting temperature-difference or any other quantity into a voltage signal; for driving light loads in instrument-type servo-mechanisms or as small power generators. Nominal voltages of 1·5, 6, 12 or 24 volts.

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OF STEVENAGE

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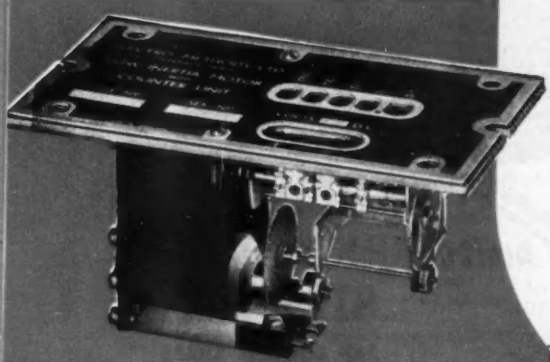
LOW-INERTIA INTEGRATING MOTORS

Comprehensive technical data gladly forwarded on request.

Most types now available for PROMPT DELIVERY



This Mechanical Counter Unit illustrates just one of the many applications open to the Low-Inertia Integrating Motor. The complete unit is manufactured by us in 4 types.

ELECTRO METHODS LTD. (Division LM5), CAXTON WAY, STEVENAGE, HERTS.
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BUSBAR TRUNKING is supplied in 12 lengths – easily extended in any direction. Tapping points are provided at intervals of 2 ft. Fused tapping boxes can be plugged in at will, and connections to load completed by short runs of cable in conduit.

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SWITCH BLOCKS
built of* KILN DRIED *timber
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AND CORRECT SHAPE

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L3819D

R. C. Cutting & Co. Ltd., specialists in lightning protection, have used Evershed & Vignoles' testing equipment for over twenty years. The above photographs show the site tests required to comply with the recommendations of the British Standards Code of Practice C.P.326.101 (1948) (Protection of Structures against Lightning) as carried out by one of R. C. Cutting & Co.'s engineers when installing a lightning conductor system.

Figure 1. A resistivity test of the earth is made with a "Megger" Earth Tester, Series 2, to estimate the length of rod required.

Figure 2. Earthing rod being driven into the ground by a percussion hammer.

Figure 3. A test of the resistance to earth of the rod to confirm that it is sufficiently low.

Figure 4. After the lightning conductor strips have been connected throughout the building, bond tests of all joints are carried out by the engineer with an Evershed Bond Tester.

Full details are available in publication J217.

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TRADE MARK

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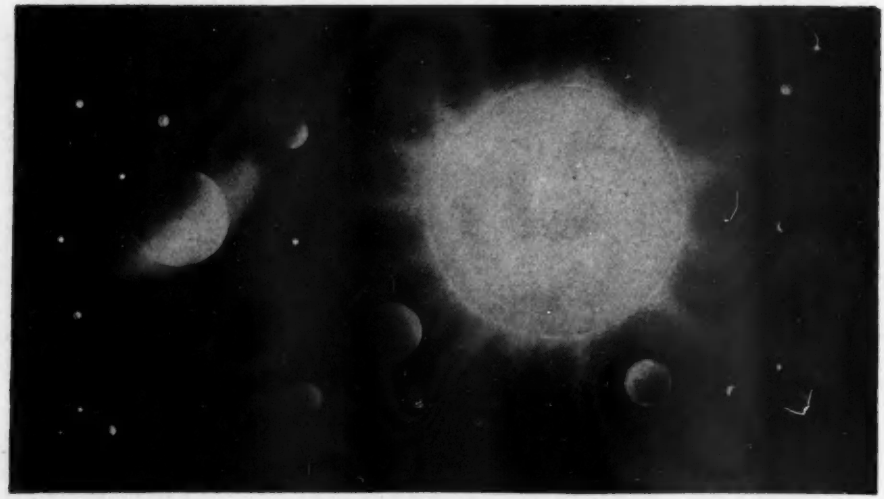
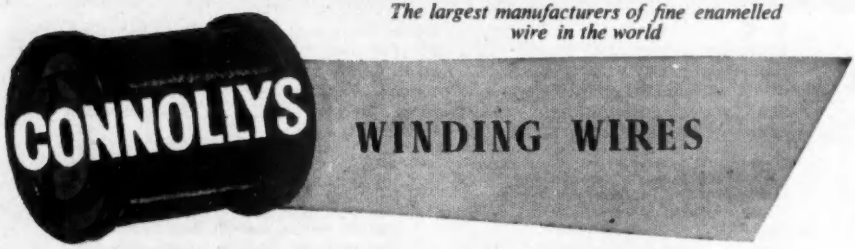


Astronomically Speaking

If our total production of all types of winding wires in the last fifty years could be tied end to end, it would stretch up to the sun—93 million miles away—and most of the way back again.
So now you have a fair idea of our total production in length—or have you?
We just mention this astronomical data en passant: the idea of running up to the face of the sun in a temperature of some 10,000°F. doesn't appeal to us in the least. Making and keeping more and more satisfied customers is our primary interest.

The largest manufacturers of fine enamelled wire in the world



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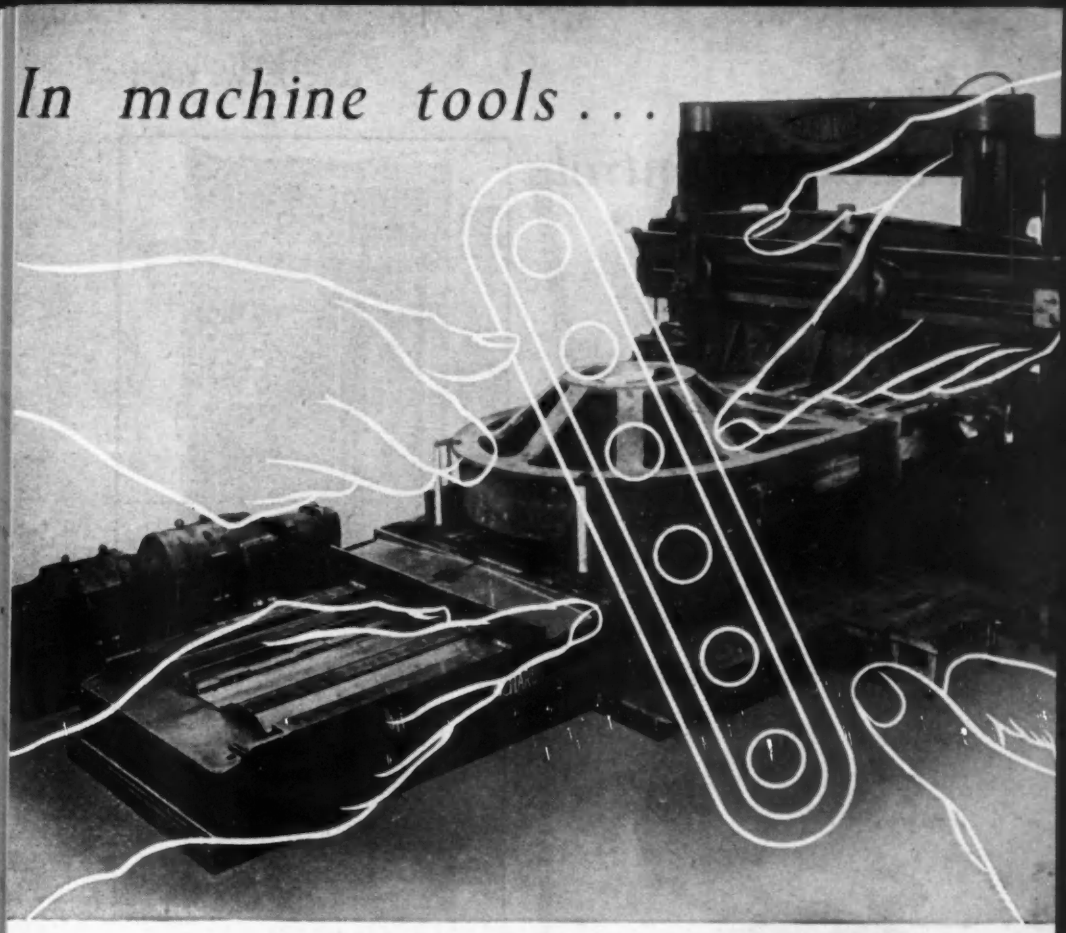

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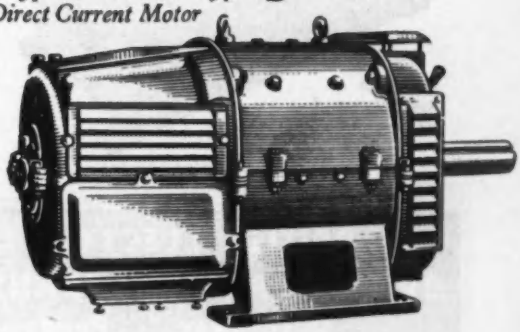

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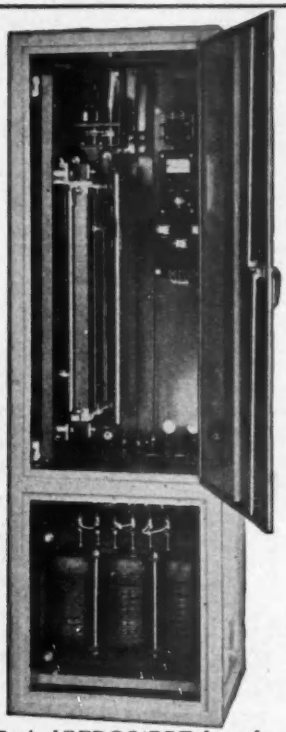

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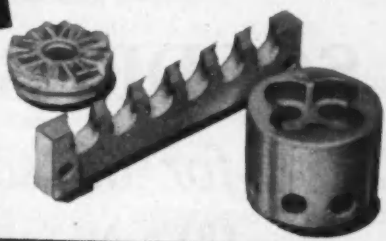

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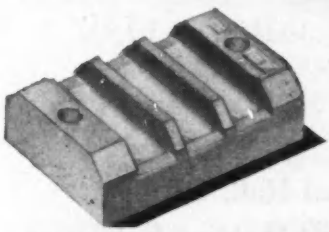

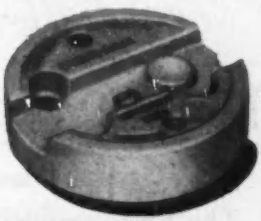

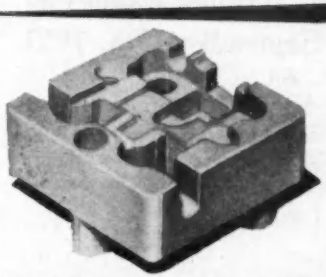

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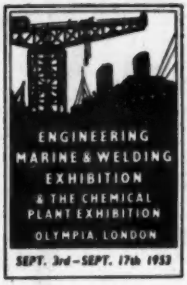

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ELECTRICAL TIMES

Volume 124 No. 3224 20 AUGUST, 1953

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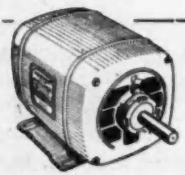

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Editorial

WATCHDOG FOR BOARDS

THE original theory that public corporations would automatically serve the public to the maximum extent has been replaced by a widespread call for a new watchdog on nationalised boards. Parliament particularly seems concerned to bring its own creations back under its own control. Accordingly a select committee was set up to consider the matter and this committee now reports that a committee should be set up with power to set up sub-committees to examine the nationalised industries. No one is very enthusiastic about the idea; indeed some are actively opposed to it; but the recommendation seems to be made largely on the basis that somebody ought to do something about it, and no one has a better idea than the setting up of another committee. Even the report dubiously stresses that it is essential for nationalised boards to regard this committee not as an enemy but as something approaching a father confessor. Already the House of Commons has one means of obtaining information on nationalised industries: through the responsible Minister. If this is considered to be inadequate in scope, the setting up of a parallel channel for keeping the House informed seems hardly to be the best of methods, and may indeed lead to confusion. It seems a more logical step to strengthen the Minister's position by the provision of a small, suitably qualified body to advise him. Something akin to the old Electricity Commissioners, with powers adapted to meet present requirements, appears to be a more practical alternative if further supervision is in fact deemed to be necessary.

AN UNSATISFACTORY REPORT

IF Parliament is determined on closer control of nationalised industries, it certainly has the power to set up the recommended committee. Therefore some of the detailed findings which are reported in full on page 326 require careful study. A most surprising feature in this report which is concerned with procedure is a definite recommendation of a criterion of performance for nationalised industries. It is suggested that efficiency would be shown, but admittedly not conclusively, by the percentage variation in cost to consumers, compared with the general cost-of-living index. Such an idea has all the dangers of over-simplification, and if such a comparison is to be made the yardstick, then Boards may be encouraged to neglect some of their important duties for the sake of a good examination result. One other matter of over-simplification is noticeable in the report. Greater powers are suggested for the statutory auditors of nationalised industries; they go beyond the limits of ordinary finance into such matters as compliance with ministerial directives and whether expenditure has or has not proved productive. After this wide-sweeping recommendation, the Committee, as though alarmed at its own daring, adds a provision that for the sake of preserving good relations the audit "should not differ too widely from that of ordinary audits." It would seem that the intention is to make the auditor a general purpose watchdog for the Committee in addition to the extensive powers to be accorded to the Committee itself and its permanent staff. Whatever case there may be for an appropriate check on the efficiency of a nationalised industry, care must be taken that too much supervision does not lead to the stagnation which must destroy any commercial undertaking.

MARGINAL SOURCES

COAL and water power are the basis of today's electricity supply industry throughout the world, and they are likely to remain its principal foundation for

some decades yet. The nagging fear of what may happen when economic supplies of coal are exhausted, however, has been largely removed by the firmly established future for nuclear energy. Yet before this latter development is completed there may be a difficult gap between power supply and demand; and there will always be a special difficulty about energy sources in isolated parts of the world. It is such considerations that show as vitally important the engineer's attempts to utilise the marginal sources of energy, which we review on a later page. Some, like tidal power and geothermal steam, have proved possibilities, but are essentially limited geographically to a few sites. In other cases, notably underground gasification and wind generation, success in the establishment of operating techniques by investigators in this country and elsewhere will bring an increase in energy availability in many other parts of the world. For both categories of possibility, the work of development is worth while, for it brings with it the chance of an accelerated raising of living standards. The electrical engineer is directly concerned in this work because the only means of putting these diverse forms of energy usefully to work in the service of man is the intermediate step of generating electricity.

DOMESTIC PROTECTION

INCREASINGLY, domestic appliances are being motorised. Since the vacuum cleaner was introduced many years ago, the electric motor has become a common feature in the home, in refrigerator and floor polisher, washing machine and food mixer, to mention the more common instances. The advance has been particularly rapid since the war, and it has accentuated a difficult problem of protection, for the simple fuse is of course only partially effective in a motor circuit. It can deal with the danger of short circuit, but if it is to pass the necessary motor starting currents, it will be quite ineffective on moderate overloads. Yet it is these that can cause a motor to burn out, and which introduce a real danger of fire starting in an appliance. In America, where a similar problem exists, the reaction of one prominent certifying laboratory has been to require protection against this risk, either by some form of overload relay or, more commonly, by an inbuilt thermal switch of some kind. This move reinforces the view we have held for some time, that greater use might be made of the direct protection that inexpensive thermal switches can give to small motors. They are, of course, not unknown in electrically powered appliances in this country, particularly in those used in industry, but there is much to recommend their wider adoption, notably in the field of automatic domestic appliances.

MORE FOR THE ROAD

A SHARP increase in the expenditure to be permitted on street lighting was forecast in the ELECTRICAL TIMES columns a month ago. This week's official confirmation of that information, together with the news that the increase is as much as 25% on last year's £2 m. limit, will be doubly welcome to lighting authorities and to the many bodies which are concerned with road safety. More schemes for improved lighting can now be carried through, and a higher standard can be attempted in these installations than would otherwise have been possible. As with all cases where permission to spend is involved, this opportune relaxation of financial restriction will take some time to come into effect, but its results should be a powerful aid to the prevention of accidents, and to the comfort of road users generally in 1954. The move adds considerable point to the lively correspondence which is proceeding in the lay Press on the subject of forms of road lighting. If the best use is to be made of the permitted increase in expenditure, then the criterion of choice must remain illumination efficiency, without too much diversion of funds to the purchase of more attractive poles and fittings to charm the daylight hours when the lanterns are unlit.

Meteor

LAND, SEA and *AIR*

A Survey of Some Auxiliary Sources of Energy for Electricity Generation

BRITAIN'S economy is built on coal, and is likely to remain so for some years yet. The same can be said of most other highly industrialised countries, though in some of them, notably on the North American continent, water power has a comparable importance, while oil and natural gas have a considerable local significance.

New Sources

Yet this long established pattern is not really satisfactory for meeting the needs of a power-hungry world, and engineers have constantly searched for new sources. It seems that their investigations have found the ideal solution in the nuclear reactor, and that the eventual development of this most promising of inventions will solve many outstanding problems. This will not entirely out-mode the thermal power station, however. Nor will it cause development to cease on many other potentially important energy sources investigated at one time or another in the widespread search for a substitute for coal.

Land, sea and air have all been exploited in their turn. Geothermal heat and underground gasification; tidal power and temperature differential; wind power and solar energy. Each is the subject of an active investigation at the present time, and each may eventually make a valuable contribution to the world's fuel economy and—of more immediate interest—to the economy of Great Britain, in most cases. All have been dealt with separately in the ELECTRICAL TIMES on more than one occasion. A combined summary of their main characteristics is of interest.

Geothermal Power

Geothermal power may well provide the first example. Hot springs are a not uncommon occurrence in various parts of the world. Occasionally, this manifestation of the

Fig. 1. Andre type wind generator mast being erected on test site at Prae Wood, near St. Albans. This generator has a rating of 100 kW and has been ordered by the B.E.A.

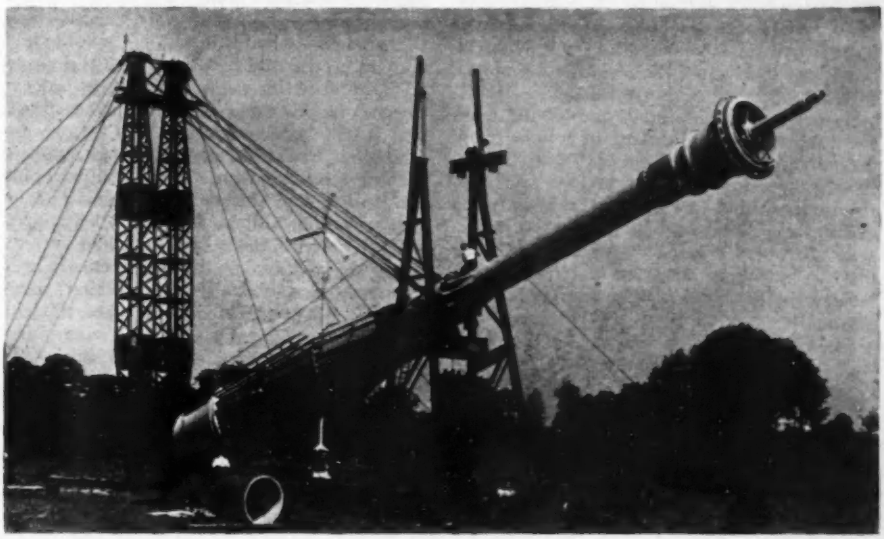


Fig. 2. Steam goes to waste in this freely blowing geyser on New Zealand's North Island

increase of temperature with depth is far more striking: not warm water, but live steam is thrown up. Up to the present the most notable example of the useful application of the energy this steam contains has been the installations at Larderello, near Volterra in Tuscany. The exploitation of the natural steam here began in 1930, and by 1950 annual production was exceeding 1,000 million kWh per annum.

To obtain the steam in good quantities borings are made to depths of 5,000 ft and more. At the surface the resulting steam has a temperature of between 160 and 420° F, and a pressure of between 70 and 220 lb/sq in. absolute. The steam differs, of course, from that obtained from a boiler. Only about 95·4% by weight is water vapour. Of the remainder about 4·4% is carbon dioxide. Other notable components are 0·032% boric acid and 0·09% hydrogen sulphide. Indeed, these provide the basis of a remunerative business in the chemical by-products of power production.

Steam consumption varies considerably with the method of generation used, but typical figures are 42 lb steam per kWh for a turbine exhausting to atmosphere, coming down to 21 lb/kWh for a condensing turbine fed directly with the live steam.

Success of the Italian venture is leading other countries possessing geysers to investigate their exploitation. Iceland and New Zealand are particularly active at the present time. In New Zealand boring has been in progress since 1951, with the intention of supplying an experimental 20 MW station. The main effort is concentrated near Wairakei, in the centre of the North Island. Bores down to 1,500 ft are already producing steam, though unfortunately it is very wet. However, methods of drying are being perfected, and there is growing confidence in the future of geothermic generation in a land that will welcome any new power source.

Underground Gasification

Energy underground in the second of our land applications comes from a more traditional source—coal. It is certain that all the coal in the earth will never reach the surface, and it is likely that much of what is known to exist at moderate depths will similarly fail to do so. Economic considerations are the reason. But if a means can be found of using the coal *in situ* it will at least not be wasted; and this is the aim of the experiments at present being carried out with underground gasification.

The idea itself is many years old, but practical trials are more recent. There were some in Russia before the war, about which typically little is known: since 1945 several countries have been making large scale trials, notably Great Britain and the United States.

Ideally, once the coal has been ignited, it should be necessary only to supply air to keep the reaction going, and to gasify the coal. Pairs of bore holes are needed, with the air being forced down one and the gas coming up the other. The precise technique adopted for this simple-sounding process depends largely on geological considerations, and is still being worked out. One process which has been used in the United States is that of electro-linkage. Vertical bore-holes are drilled, and electrodes forced into their base. A high voltage is applied between a pair of bore-holes, and the resulting current sequentially dries out the coal, heats it to a temperature at which carbonisation commences, and then provides a more efficient heating effect by passage along the resulting low-resistance coke threads. Fissuring is incidental, and gas may be extracted from one bore-hole. This technique is to be tested shortly in Britain.

Although gas is the product of the process, it normally has a low calorific value, and the main hope for its usefulness is in the genera-

tion of electrical energy on site. High compression gas engines, or, more probably, the gas turbine may provide the means of generation, even when calorific values are well below the usual values.

Deep Cold

If it is high temperature far below the surface that provides the attraction when the land is to be used for power production, the opposite can be said of one of the most ingenious means of using the sea. This has been developed notably by French engineers for an installation at Abidjan, on the Ivory Coast, French West Africa. As with other schemes, its principle is simple. There is a steep temperature gradient from ocean surface to sea bed, and in tropical latitudes this may result in a temperature difference of as much as 36° F between surface (82° F) and sea bed (46° F).

Such a temperature difference represents enormous potential energy, and a modification of the standard steam condensing turbine permits its realisation. In the simplest terms, part of the warm surface water is evaporated under vacuum and then "inhaled" by a condenser, passing through a turbine on the way. The condenser is cooled—and the vacuum thus maintained—by the cold water from the sea bed.

The first practical difficulty that had to be overcome was the provision of a suitable intake pipe for the cold water. This was constructed of metal with armoured rubber joints. Turning to the condensers, the air pumps are of course of great importance, and special studies were made of their performance.

The turbine as a whole is completely encased in an airtight cover. A rotor of 26 ft diameter working at 600 r.p.m. is necessary for an output of 5·8 MW. The general arrangement is shown in Fig. 3.

A somewhat similar scheme of using temperature difference has been adopted in the Belgian Congo (see ELECTRICAL TIMES, November 20, 1952), but there the hot water comes from a hot spring, with a temperature of 196° F, while even the "cold" water obtained from a nearby reservoir has the comparatively high temperature of 74·5° F. In the result, a pressure drop of 3·34 lb/sq in. is secured across the turbine, which gives an output of 220 kW.

Tidal Schemes

The second method of using the sea for power production comes right away from thermo-dynamics into the world of hydraulics. Tides rising and falling through considerable vertical distances have for long attracted the attention of engineers because of their potential energy, but singularly little has been done to harness them.

In Britain the most promising site has always been at the mouth of the Severn, and the possibility of a barrage has been canvassed for many years. The most recent authoritative report on the scheme was that made in 1945 by a team of three consulting engineers, and this was on the whole favourable to the idea of such a project.

At Severn Bridge, some 18 miles upstream from the mouth of the river, spring tides rise over 30 ft, and neap tides over 18 ft, these changes being much influenced by the wind. In addition there is, of course, the famous Severn bore, which rushes up the river in the upper levels.

In the last published report on the subject, a barrage was envisaged at the "English Stones," a sandstone feature above the point where the Western Region railway line tunnels under the river. A sluice dam would be constructed across the Stones, containing 128 sluices, and at right angles to it would be a turbine dam and locks for shipping. The main channel of the Severn would be closed by an embankment dam, and finally there would be a second turbine dam abutting onto the Monmouthshire bank.

Each turbine dam would house 16 turbo-

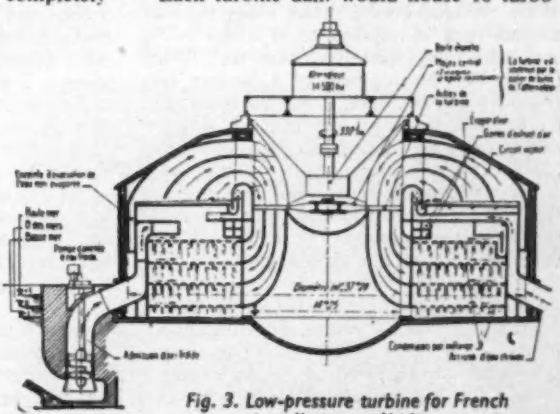


Fig. 3. Low-pressure turbine for French installation at Abidjan

alternators of 25 MW rating each. To deal with the short periods of maximum output at spring tides, the turbines and their associated alternators would be designed to have an overload rating so that 30 of them generated 800 MW.

In any such tidal scheme there is inevitably a wide variation in the head of water on each turbine. To deal most effectively with this, vertical shaft Kaplan type turbines would probably be installed, running at not more than 50 r.p.m.

Such a scheme would be operated on single tide working, the rising tide being allowed to flow through the sluice gates, which would then be closed. On the falling tide the sluices would be closed and the water discharged through the turbines.

It is estimated that annual production of energy for transmission would eventually reach 2,200 million kWh. The difficulty is, of course, that generation would be confined to two periods of seven hours in each 24, the times at which generation started becoming 48 minutes later each day. Thus there would be no firm power output to meet peak load demands and the scheme could only be justified from an electrical viewpoint on the basis of coal conservation and economy of operation.

At the present time there is in existence a Committee of the Hydraulics Research Board on the barrage, with particular reference to model investigations. It is hoped that development of the new research station at Wallingford on the banks of the Thames will soon allow it to make some practical progress.

Wind Power

Land, sea — and air. The mighty forces of air movement have shown many signs of a come-back in importance in recent years, and British engineers have been well to the fore in this development of a modern successor to the windmill. A windy site and an efficient generator are the two requirements, and a dual search has been proceeding for both.

The basic difficulty of wind generation is the relative lightness of air; the power in the wind is proportional to air density, the effective area of the air-turbine rotor, and the *cube* of the wind velocity. 0·0054 V^3 watts per sq ft has been quoted for the British Isles, where V is the wind speed in miles per hour.

Ultimate development might be expected to take the form of some hundreds of sites, most of them on fairly high uncultivated land near the sea, and occupied by windmill generators having a unit capacity of perhaps 2 MW. Such windmills might stand on towers 150 ft or more high. As with tidal schemes, there would be no firm power—days of calm will inevitably occur — but weather forecasts might possibly give an acceptable prediction of output some hours in advance.

Present experiments are limited to far more modest units, with associated induction generators rated at 100 kW. There is a "conventional" machine in operation on Costa Head in the Orkneys, whilst the interesting André design is at present being erected ready for tests in this country. This latter machine has the advantage that its air turbine proper and generator are situated at ground level, readily accessible for any maintenance work. As a result of this, the propeller tower can be relieved of a not inconsiderable weight.

As well as the investigations being made in this country, which centre around the Electrical Research Association's wind-power team, many other European countries are showing an interest in the possibilities of harnessing the wayward energy of the wind, and it is promising for the future of this method of generation that arrangements for co-operation in this field have been developed.

The Sun

It may be well to conclude this survey with a note on the eventual source of all these energy forms, as of those that are more conventional. This, of course, is the sun. The direct application of the heat energy that is radiated onto the earth's surface during daylight hours has always been an attractive proposition, but it has not as yet proved a really practical one. A recent report of an NPL committee which studied the subject states "... it seems unlikely that solar energy can be an important source of heat or power in the future, although some applications may be possible in specially favourable circumstances."

Turning to figures, the average rate at which solar energy reaches the earth's surface is between 0·1 and 0·2 kW/m^2, although it may reach as high as 1 kW/m^2 in some places. Even under the best conditions, the mirrors required for power generation using a conventional thermal cycle would be unduly large. The best chance would apparently be to use the sunlight for growing suitable trees, and then burning them: the efficiency of utilisation of sunlight by growing plants is found to be

remarkably high in certain species.

Nevertheless, although there is no real prospect of success in harnessing solar energy for the service of large communities, it does seem that there are possibilities for use in isolated districts. Research is being directed to that end, and promising results are being obtained. For this country, of course, there is no likelihood of any worth-while application being developed.

Conclusions

Once more it must be stressed that all these methods of generation must be marginal: they are attempts by man to exploit for his advantage the special conditions that prevail in certain restricted areas of the world. Nevertheless, with the demand for power steadily growing, they have their part to play in preventing shortage and in keeping prices down to a reasonable level.

So far as Great Britain is concerned, it is of interest to recall what Sir John Hacking had to say on some of these possibilities in his presidential address to the British Electrical Power Convention. Underground gasification of thin seams he noted as meeting with some success, but he thought that current indications did not suggest that it would reach significant proportions. Development of wind power he considered a matter of great uncertainty, but it might possibly reach an annual output in 20 years' time that would save one million tons of coal per year, he thought. The Severn Barrage if constructed might save an equal amount.

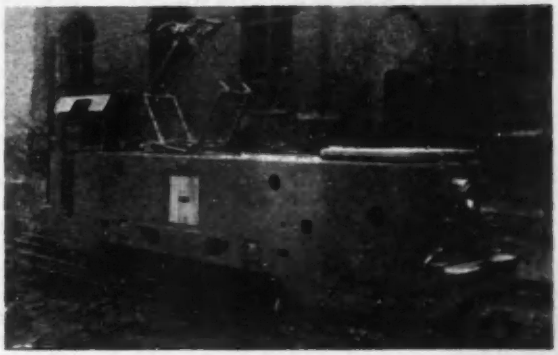
TROLLEY LOCOMOTIVES FOR MINING

LAST month the first underground trolley locomotive installation in a British coal mine began functioning in the south tunnel at Sandhole Colliery, Lancs. The length of track is about 1¼ miles, the average gradient being about 1 in 100 in favour of the load. A substation at approximately the mid-point is equipped with two 120 kW mercury arc rectifiers (one as spare) together with the necessary transformers and a.c. and d.c. switchgear. The incoming supply is at 2 kV, 3-phase, and the locomotive supply is 250 V d.c.

The locomotives are of the 2-axle type weighing a little over 2 tons each and powered by two axle-hung traction motors driving through single reduction spur gears. Each locomotive has a one-hour rating of 62 h.p. Contactor gear has been provided and the traction motors are forced air cooled from a motor-driven blower. Straight and emergency air- and hand-brakes are fitted so that the locomotives can be used to haul man-riding cars as well as coal tubs. Seventy tubs can be hauled at speeds of up to 12 m.p.h., and initial operation has shown that the locomotives have a fair reserve in hand.

Safety precautions include the usual interlocking of driving and reversing handles, together with a "dead-man's handle" feature, blower warning light, no-volt and overload protection. In addition, a special air-operated switch enables the driver to cut off power from the overhead line in emergency, and a safety trip-wire is also installed along the side of the road. Overrun trips and warning lights are also located at each end of the section.

Main contractors for the locomotives, substation equipment and switchgear were the Metropolitan-Vickers Electrical Co., with E. E. Baguley Ltd. as sub-contractors for the mechanical parts of the locomotives. The overhead equipment and special rail bonds were by Liverpool Electric Cables Ltd. with Wiseman and Co. as sub-contractors.



This photograph taken at Metropolitan-Vickers Electrical Co.'s works shows one of the locomotives now being used at Sandhole

PROBE

INTO NATIONALISED INDUSTRY

New Parliamentary Committee Recommended

ACCOUNTABILITY of nationalised industries to Parliament has been a subject of debate ever since the main nationalisation acts were passed in the years immediately following the war. Recently a Select Committee of the House of Commons has been investigating the matter, and last week it published its report. Its recommendations are far reaching in their potential effects, and if they are implemented, they can hardly fail to have a sharp effect on the operation of the electricity supply industry at the highest level.

As a result of its deliberations during the 1951-52 Parliamentary Session, the Committee recommended that there should be no major change in the prevailing practice concerning questions to Ministers about nationalised industries. Questions on details of day to day working should not be permitted. However, this decision left unchanged the desire for some closer examination of the activities of the nationalised industries.

A Standing Committee

The solution suggested is that a Standing Committee of the House of Commons should be appointed with power, in the traditional words "to send for persons, papers and records, to set up sub-committees, and to report from time to time." This committee, if appointed, would take over the present right of the Committee of Public Accounts to examine the accounts of the nationalised industries, but it would go into those accounts far more thoroughly. Indeed, it would consider not only the present and the past, but also future plans and programmes.

The aim of the Committee, it is felt, should be to set up a tradition that will lead the boards concerned to regard it not as an enemy and a critic, but as a confidant and a protection against irresponsible pressure, as well as a guardian of the public interest. In the first instance it would deal with the chairmen and board members of the nationalised industries: there should be no investigation of matters of detailed administration.

To enable a check to be kept on the industries concerned suggestions are made for two new features of annual reports and accounts. In the first place, the great public corporations should be encouraged to prepare statements of anticipated revenue and expenditure, so that Parliament can satisfy itself that each has genuinely tried to comply with its statutory duty to break even. Secondly, as a check on the efficiency of the industry, there should be an estimate of the change in cost of its products or services since its establishment, compared with the changes in the general cost of living index. Further, the statutory auditors of the corporations, in preparing their annual reports, should give such information in addition to that now provided by them, as may be of use to the Committee and of interest to Parliament.

All of this, however helpful, still leaves a committee of busy M.P.s with much detailed investigation on their hands if they are to carry out their task properly. To assist them, it is suggested that there should be appointed a high ranking permanent official who would work with the assistance of at least one professional accountant. His duty would be the examination of the reports and accounts of the nationalised industries, and the direction of the committee's attention to matters requiring examination. Further assistance might be given by a senior official from the appropriate ministerial department.

Information—not Control

It is perhaps necessary to emphasise once again the importance which the Select Committee has attached to the approach adopted by the proposed Standing Committee. They feel it should seek essentially to inform Parliament about the aims, activities and problems of each corporation: not to control its work. Indeed, the whole idea of appointing a committee has been put forward only because it is more convenient and less objectionable than other ways of keeping a check on the nationalised industries. Yet it is apparent from the evidence appended to the report, that there are many experienced people who have grave doubts about the wisdom of setting up any such committee.

Dual Purpose Cooking Utensils

Black base aluminium design provides best compromise for mixed cooker

By D. N. VEITCH*

THE growth of mixed radiant and solid hotplates in electric cookers is causing major repercussions in the electrical industry, and both market and product research is resulting in the advent of a completely new style of electric cooker utensil.

The resurgence of the radiant hotplate poses questions which must be answered by all involved in the production, sale and maintenance of electric cookers. Advantages, such as cleanliness, lack of unpleasant odours and ease of positioning over the main competitor, gas, stress the importance of appreciating positive virtues, rather than adopting a " defensive " approach to detailed criticism from obviously biased sources.

Fundamental Questions

In the interests of a long-term competitive sales policy, the industry must, it would seem, be unanimously certain of the answers to fundamental questions:—

1. Is the electrical industry ever justified in agreeing to installation of a cooker which is working at maximum efficiency only when various "extras" are added?

2. Is not this stripping down of cookers to permit " low initial cost " at the expense of efficiency a negative approach which is doing harm to the industry as a whole—rather than meeting competition with lowest possible *price subject to maximum efficiency?*

3. Is the mixed radiant and solid-plate cooker being offered to the housewife because (a) she demands it, or (b) the industry thinks she does because of the hoodoo of visual heat, or (c) the industry itself is undecided as to which is the best and most satisfactory method and is therefore compromising?

4. As evidence *does* show a definite trend towards universal use of the mixed-plate cooker, and as statistics presented later in this article prove that competitive efficiency can be gained only with right utensils for each type of heating: is the consumer to be left to buy two sets of pans, or is one set of dual-purpose utensils to be offered as an incorporate part of cooker equipment?

Consumer Considerations

In choosing between gas and electric cookers, the consumer first considers media and then price, appearance, oven space and similarly direct pro's and con's. Should these considerations draw equal in the opinion of the prospective buyer, the decision finally lies in speed and flexibility of temperature on the hob.

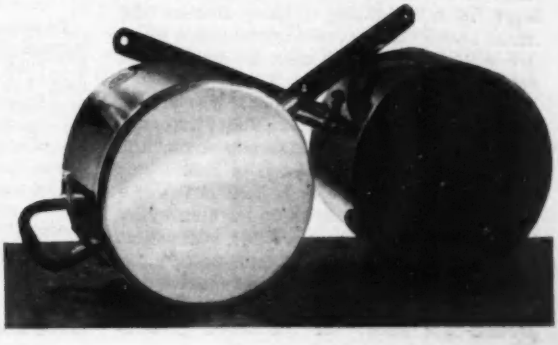
General acceptance of temperature control devices meets all arguments of flexibility. The outstanding problem is, therefore, that of speed.

"Speed" to the technician means increased efficiency. To the husband it means lower electricity accounts. But to the housewife—the ultimate arbiter—"speed" means faster boiling, a quickly-heating cooker, and speed-through-simplicity of regulation and control.

In the best interests of these demands it is vital that the merits of radiant and solid hotplates are known relative to specific types of cooking vessels. The question must be answered: " Are special utensils necessary with either radiant or solid hotplates?"

Pyramid Aluminium Ware have, over the past year, carried out experiments calculated

Single-purpose bright-ground base or dual-purpose anodised finish is the choice propounded in this photograph



* *Man. dir. Pyramid Aluminium Ware.*

to produce a reliable basis for development of utensils to meet the new dual-purpose need. A series of approaches were developed

TABLE I. COMPARATIVE HEATING PERIODS WITH POLISHED AND BLACK-BASE UTENSILS

Type of pan	Type of hotplate	Time in minutes and seconds			
		2 pts.	3 pts.	4 pts.	5 pts.
Light aluminium	1,600 watt radiant	8·42	11·25	13·05	15·30
Light aluminium	1,800 watt solid	10·02	11·55	14·25	17·50
Ground/ black-base aluminium	1,600 watt radiant	7·28	10·03	11·45	14·16
Ground/ black-base aluminium	1,800 watt solid	7·32	9·54	11·25	13·50

and tried. Out of repeated trials two convictions were factually confirmed: (1) For solid hotplates there is no substitute for the non-distortion ground-based utensil and (2) for the radiant plate a black base, designed to absorb radiant heat, proved conclusively superior, as would be expected from fundamental physical considerations.

For the Mixed Cooker

Thus, to give maximum speed, efficiency and economy to the mixed cooker, which, market-research shows, is in many districts becoming almost universal, the obvious perfect cooking medium is a ground-based utensil incorporating a permanently darkened base: so drawing maximum efficiency from both radiant and solid plates.

To accomplish the economical reality of such a dual-purpose utensil the mixed-cooker utensil described below was perfected after considerable experiment, and the first of the new dual-purpose range of aluminium ware has gone into production.

The results are attained with surface treatment of the base metal through a process of black-finish anodising. This oxidises the metal and simultaneously introduces a black dye which becomes an essential part of the basic metal.

Applied to ground-base pans, this attains maximum efficiency on radiant hotplates without in any way detracting from the utensils' efficiency on solid hotplates.

Comparison tests were carried out. Varying types of 8 in. base fitted-lid aluminium cooking utensils were used for both short and long-time cooking. Light-gauge pans, with bases reasonably flat, were made up to the quality embodied in standard Pyramid ground-base pans; the blackened ground-base pans were of the new Pyramid line. (Patent applied for.)

As a convenient method of measuring cooking time, controlled volumes of water were boiled to provide comparative figures only. The important figure to be compared was the length of time taken. The heating media were a new 1800 watt solid plate and a new 1600 watt radiant plate. In all cases the commencing temperature of the water was 62° Fahrenheit, and the plate cold.

Special Utensils Necessary

The figures obtained prove conclusively that no ordinary utensils can give maximum efficiency on any type of hotplate; that special utensils must be an integral part of any cooker. Dual-purpose utensils of the type described are particularly essential to the economic efficiency of the mixed-plate cooker. They prove that, as mixed cookers increase so must attendant aluminium ware become progressively important in the industry's overall competitive policy. Above all, they prove that we are on the eve of a revolution in quality cooking utensils.

BRITISH STANDARDS

Photo-electric cells of the emission type for sound film apparatus. *B.S.* 586 : 1953. *Price* 2*s.* 6*d. net.* Standard sizes for cells specified in the 1935 edition of this standard failed to gain universal acceptance and this revision has therefore been issued. Specified performance characteristics of cells have been brought into accord with present-day requirements, together with the inclusion of a code system of symbols designating all characteristics. Moreover four sizes of cells, from the variety manufactured, are proffered in the standard.

Red fir wood poles for telegraph and telephone lines, B.S. 139 : 1921, and **European larch poles for transmission lines, B.S. 513 : 1933.** These standards have now been withdrawn and are replaced by B.S. 1990 : 1953, "Wood poles for overhead lines."

Dimensional features of measuring and control instruments and panels for industrial processes. *B.S.* 1986 : 1953. *Price* 3*s.* The use of automatic control and measuring instruments in the process of the oil, steel and chemical industries is increasing rapidly. The increasing complexity of modern plant calls for flexibility, and interchangeability of the instruments employed. Recommendations in this standard aim at encouraging the adoption of this principle. There are dimensions for recorder charts and for the characteristics of the clocks that drive them, notes on methods of fixing instruments, and recommended sizes for panel apertures.

British Standards reviewed above can be obtained from the B.S.I., 2 Park St., London, W.1.

Our readers' views ...

A Link with Kelvin

MR. R. H. RAWLL'S interesting letter in the ELECTRICAL TIMES issue dated July 23, prompted a search for some additional facts concerning the pioneer generation/dust-destruction plant at Shoreditch.

It appears that the plant was quickly imitated by Fulham, Hackney, Bermondsey, Stepney and others, and that it converted, in nine months working, a deficit of £300 into a surplus of £5,000. The lamps connected increased, in the same period, from 4,000 to 25,000.

Nearly all of the pioneer undertakings were sound engineering conceptions but not many, I fear, showed such attractive trading results in their early years.

E. H. Jesty

BROMLEY, KENT A.M.I.E.E.

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New Cable Standards

PROPAGANDA at present being circulated by one side of the electric cable industry would lead one to believe that (to quote) "These new standards represent the culmination of extended and patient experimental work carried out over a period of years."

How far this body of opinion may be qualified to speak for the industry as a whole, in respect of types of cable involved, is a question for "patient thought" by the careful and experienced buyer. The question might possibly be asked what the other participants in the development of the standards were doing whilst they were being prepared for them?

Other people of long standing in the industry might ask, if such reduced dimensions are today the fashion, why in the war-torn years such reductions were not adopted in place of the reduction in rubber content. In those days, not only would we have saved the same amount of rubber (smoked sheet), but also a considerable quantity of ancilliary raw material Furthermore, one can be reasonably certain that, had such standards been then employed, they would almost certainly have remained, with a considerable saving of valuable dollars and short-supply materials which gave so much trouble in the immediate post-war years and during the Korean crisis.

During the pressure of these war years p.v.c. came to be produced more generally and that important insulant, Polythene, was born. With the rise and success of the p.v.c. and Polythene/p.v.c. cables and their very wide application and use for general purposes, one wonders how far their technical superiority and competitive production have been responsible for the reduction in dimension of most Standard rubber-insulated cables.

As sure as the jet engine will replace the piston type, so the new and more modern types of cable will replace the older and what must always be the more costly type. The rubber cable manufacturers have received a blood transfusion but it only remains for the p.v.c. and Polythene manufacturers to reduce the prices of the compounds, together with a sensible approach to thermoplastic cable and flexible dimensions, for the temporary advantage to be lost.

W. L. Wray

MANAGING DIRECTOR,
WANDLESIDE CABLE WORKS

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Trials and Tribulations

YOUR contributor J. A. W. (Problems and Practice, August 6) surely has forwarded his notes to the wrong paper, or journal.

If he has reached his majority, and has taken his place as a responsible person, he must know that we are all guilty of human frailty at one period or another. On the other hand there is a saying that "those who don't do anything, can't do anything wrong."

To condemn a fitter and put him off the job is throwing away experience, as it is my opinion that any man worth his salt would not make the same mistake twice. So far as the plumber is concerned, he probably has more problems to solve in a week than your contributor has in twelve months. One has but to realise that he, the plumber, may be ten miles away in the country, away from all mechanical means of effecting repairs, and faced with the job of obtaining a water supply in two to three hours in order that cattle may not suffer from thirst. He is quite justified to a certain extent in his methods.

As regards the last item and the last paragraph, I am pleased to note that he roundly condemns himself, and I would suggest that if there is a junior draughtsman apprentice, employed with his firm, he takes his final problem to him for solution, and this before manufacture of the spare rotor is started.

H. Mansfield

WELLINGTON, SHROPSHIRE

* * *

Naming the Goods

THE comments by "R.A." in your issue of August 13, where he deals with the question of actual manufacturers' names being included on subsidiary items in equipments, is certainly something which needs to be ventilated. A particularly interesting facet of the problem is the case of indicating meters embodied as parts of switchgear and so on.

In one example, a firm sent a faulty meter to the manufacturers of the main equipment, whose name alone appeared on the meter itself, and received it back, repaired, after some considerable time. During the interval it had travelled a distance of well over 1,000 miles on British Railways, and by an ironic chance, the actual makers of the meter were located within some 50 yards of the firm whose meter it was. Apart from inevitable transport charges, the risk of damage in such cases is always present, and the paperwork with its associated clerical charges, out of all proportion. The instrument maker's name or monogram should obviously be included, in all cases of this nature, on the face of the instrument itself.

"Charge Engineer"

LONDON N.W.1

Conduit Capacity for V.R.I. Cables

Graphical Calculations for Revised B.S.7

THE problem of deciding what size of conduit is required for a number of wiring cables of various sizes often occurs in practice. For the installation engineer, the solution of the problem is a constant source of inconvenience.

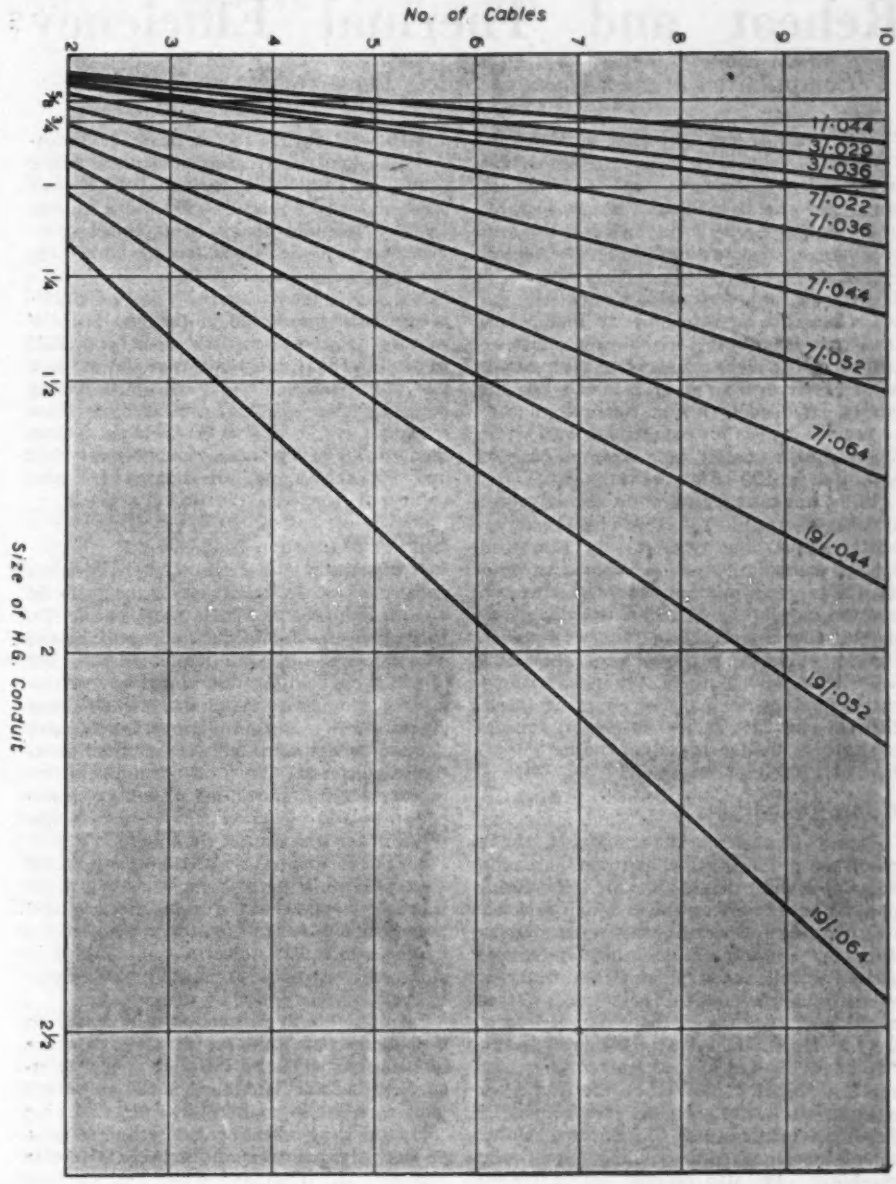
Since an unlimited number of tables would have to be published for all possible combinations of v.r.i. cables in all sizes of conduit (and trunking and ducts) a graphical method has much to recommend it. One of universal application to 250 V grade v.r.i. cables was published some time ago (ELECTRICAL TIMES, 24 April, 1952), but this has now been rendered somewhat out-of-date by the release of cables to the revised BS7. These cables have in general smaller overall dimensions than those of the same conductor cross-section made to the earliest editions of the standard, and to cater for them the curves shown opposite have been prepared by Mr. R. Croft, B.Sc. (Hons.).

Method of Use

For a full account of their use and of the theory underlying them, reference should be made to the original article. If two 7/·044 and four 7/·064 cables are to be run in one conduit a start is made on the 7/·044 characteristic at the intersection with the two cable ordinate. A line is drawn from this point parallel to the 7/·064 characteristic, to the point where the six cable (2+4) ordinate is intersected. Projecting down to the abscissa, and taking the next largest size of conduit to the point obtained enables the problem to be solved.

The curves are based on a ratio which might be called the efficiency (η) of the conduit run, which is defined as the ratio of the sum of the overall cross-sectional areas of the cables installed (A_c) to the actual internal cross-sectional area of the conduit (A). Another useful term is the effective area of the conduit (A_e) which is the product of the efficiency and the actual area, i.e. $A_e = \eta A$. In the American "National Electrical Code" an average figure of 40 % is taken for the efficiency.

In selecting a value for efficiency allowance has to be made for clearance, for ease of drawing-in; tolerance in conduit size; and tolerance in cable size. An examination of Table 22 in the I.E.E. Wiring Regulations suggests that the maximum practical efficiency approaches a limit of 45 %. This figure has been used for the curves opposite, in which a series of straight-line graphs of number of cables against overall cable area is plotted for each size of cable, and the area scale calibrated for heavy gauge steel conduit.



Conduit Capacity for V.R.I. Cables

These curves, prepared by Mr. R. Croft, B.Sc.(Hons.) may be used to calculate the capacity of heavy-gauge conduit for a bunch of cables of various sizes. The method of use is described briefly in the article opposite, and more fully in the Electrical Times, *April 24, 1952 where the theory is developed at length*

Reheat and Thermal Efficiency

Computation of the Effects of Single Stage Reheat on Turbines

THE growing use of reheat in high-temperature high-pressure plants particularly in the United States has made the question of design for reheat conditions of considerable importance. Recently published in the Proceedings of the Institution of Mechanical Engineers (Proc (B) 1952 Vol. 1B, No. 7) is J. C. London's paper which essentially extends the work by Baumann and Finniecome on improvements in thermal efficiencies on non-reheating plant. The same assumptions as in Finniecome's paper are made, and the curves extended to higher steam conditions to provide a basis for comparison with single stage reheating cycles, on a common basis of 600 lb/sq in. 800° F non-reheating.

With single-stage reheating the effect of varying the feed-temperature at different reheat pressures illustrated by the results of typical examples which were calculated to determine the optimum feed temperatures, and the improvements in thermal efficiencies due to reheating at various pressures, plotted for stop-valve steam pressures of 900, 1,200, 1,500 and 2,000 lb/sq in. It is perhaps remarkable to note that the improvement in thermal efficiency at 900 lb./sq in. appears to have a greater maximum value (5·5%) than at 2,000 lb per sq in. (4·3%).

Communications

Perhaps the more interesting part of the published information, to the general reader, lies in communications. Mr. R. Ecker pointed out the discrepancies which exist between the various steam charts in use, and the differences in estimates of turbine efficiencies due to differences in assumptions made by various manufacturers. These he considered could lead to errors of the order of 0·25 to 0·5%. He thought that the curves giving "optimum" values of feed temperatures with reheat turbines, confirmed on the whole, the existing practice of using only slightly higher final feed temperatures for reheat machines than for the corresponding non-reheat machines. He also pointed out that since thermal improvements equal to those obtained with reheat cycles could be obtained by increasing the stop-valve temperatures by about 150° F, it would appear unlikely that reheat cycles would be used other than with the highest temperatures. Although economics were outside the scope of the discussion, he tentatively suggested that where conditions of 1,500 lb/sq in., 1,050° F were justified for non-reheat, 1,800 lb/sq in. and 1,050° F would probably be chosen with reheat. At 2,000-2,500 lb/sq in., two-stage reheating might be considered.

Mr. J. R. Finniecome, who had been concerned with the design of the first 20 MW reheat plant in the world at North Tees (1920) pointed out that only six power stations and two industrial plants in Great Britain used reheat cycles. Total capacity of these machines was about 750 MW. In the United States, 6,000 MW of reheat had been installed and 15,000 MW was on order. He also compared American and British practice.

Economy

A suggestion that the use of dimensionless parameters might be of use in the problem was made by Mr. R. W. Haywood, while Mr. E. B. Johnson discussed the economic values of steam pressure and temperature in the reheat cycle. In the non-reheating machine it was customary to match increases of steam pressure with increases in temperature to give a more-or-less constant wetness fraction at the exhaust end. This did not apply to the reheat machine, and in his view high steam-pressures and moderate temperatures might result in the best overall economy.

Mr. T. F. Thomas wrote that one per cent improvement in thermal efficiency on a single year's new plant would save about 40,000 tons of coal/year and represented about £1¼ million. In cooling-tower stations, with their comparatively poor vacuum, improvements in cycle efficiency were of greater value.

In reply, Mr. J. C. London commented on the points raised, in some detail. On the question of two-stage reheating at high pressure, he had calculated the additional thermal gain at 1,500 lb/sq in., 1,050° F, reheating to 1,000° F by reheating in a second stage to 950° F; the gain was about 1·6%. He also thought Mr. Thomas's statement was not necessarily exact. The improvement in thermal efficiency due to reheating was less than ¼% lower compared with the non-reheat machine, for a vacuum fully 1 in. less than 29 in. This was a strong argument in favour of reheating, whatever the vacuum.

NOTES ON WIRING by Megohm

Festive Lighting

MANY have found much pleasure in visiting London during the Coronation celebrations and were delighted to see the wonderful lighting of our building façades and thoroughfares during this event. There is no doubt at all that good lighting has a stimulating effect and much more could be done in this direction. I venture to suggest all that is wanted is a little encouragement and an incentive to get public authorities and building owners interested to equip and install new and attractive outdoor lighting schemes to cheer us up and show visitors to this island what we really can do in the way of outdoor flood and decorative lighting.

Opportunity for B.E.A.

Surely here is a great opportunity for the British Electricity Authority to create the incentive by offering very favourable rates and at the same time help themselves by utilising idle generating plant during off-peak hours and so draw into their coffers a useful revenue to help to balance their rising costs in generation and distribution. The electrical industry as a whole would also obviously benefit by the demand that would be created for more wiring points, equipment and lamps which in turn must necessarily lead to further improved designs and efficiency, in lighting equipment and lamps. The Coronation outdoor lighting effects certainly attracted people to the centre of London and some of the increased revenue to businesses in the central London area can surely be set against the cost of installing festive lighting installations.

Down The Mall

The lighting of the Mall attracted particular attention and of its kind would be hard to better. The architects and lighting engineers responsible for the design and equipment and the men who installed and completed the work are to be congratulated for this simple and very effective lighting display. This installation, excluding the stand lighting, comprised four decorative tubular steel arches spanning the carriage-way which were positioned at approximately equal distances between Buckingham Palace and the Admiralty Arch. Along both sides of the carriage-way were also erected decorative standards 45 ft high and positioned at some 250 ft intervals. Each arch was equipped with two 500 W silver mirrored lamps positioned on each of the four limbs some 16 ft above ground level and focused to illuminate a coronet suspended 45 ft above the carriage-way between the limbs of each arch. At the apex of each arch two 150 W silver mirrored lamps were positioned and focused on the heraldic lion and unicorn with two 75 W silver mirrored lamps to light the finials above.

The decorative standards were each equipped with four 150 W silver mirrored lamps carried on slender projecting arms and positioned about 16 ft above ground level focused to illuminate the banners, with four 75 W silver mirrored lamps fitted at high level focused on the crowns at the top of each standard. The animated or twinkling effect produced by the lamps coming on and off was quite simply effected by four time controlled contactors arranged to make and break the circuits consecutively at approximately one-second intervals.

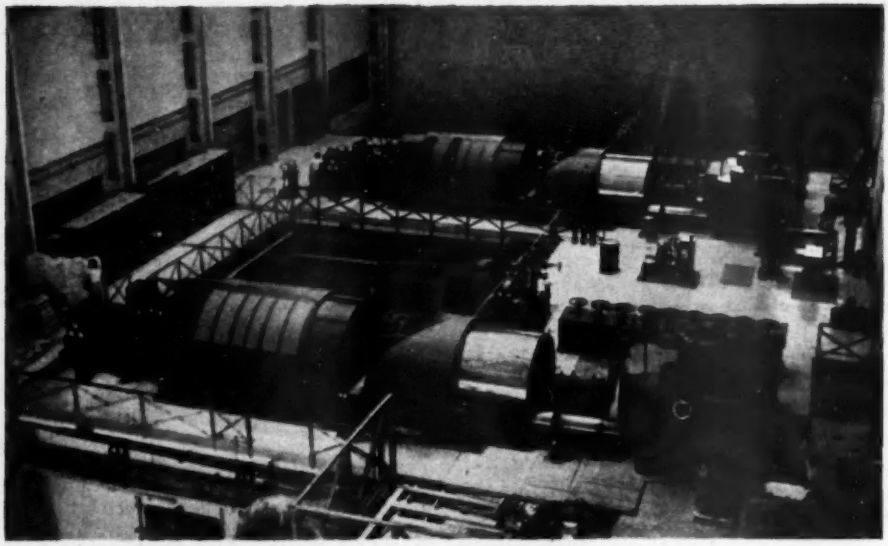
A Lost Effect

The many excellent photographs that have been published of the Mall Coronation lighting unfortunately have not conveyed the brilliant effect one saw on entering the Mall which every evening was thronged with people.

Engineers will be interested to know the installation was wired throughout with tough rubber sheathed cables and catenary supported cables and these cables were concealed as far as possible by the foliage of the trees on each side of the Mall.

Lighting at Kew

The standards have now been dismantled and removed and I understand the four arches are to be dismantled soon and will be used again for some purpose in Kew Gardens which brings me to the point—why cannot we have flood and decorative lighting in Kew Gardens? What a wonderful show could be made here of lighting the flower beds and hot houses after dusk through the late summer and early autumn months of each year.



Pasir-Panjang Opened

THE Pasir-Panjang Power Station of the Singapore Electricity Department was formally opened by His Excellency the Governor of Singapore, Sir John Fearns Nicoll, last month.

Situated about five miles from the centre of the city, the power station buildings have been designed to conform with modern architectural standards, and although the steam pressures and temperatures selected (625 lb/sq in 825°F) are not unusually high, it will rank as one of the most efficient power stations yet constructed in the Far East.

The site selected is near the coast on the south west side of the Island and covers an area of 12 acres. This gives good accessibility to sea water supply for circulating water for the condensers and permits the delivery of coal or oil by sea-going vessels.

The main building will have a final length of 548 ft with a width of 279 ft, and is of steel frame construction with reinforced concrete floors and roof. Local bricks have been used for the walls.

Twin culverts, each with a cross sectional area of 64 sq ft take the circulating water into reinforced concrete monolith chambers extending some 32 ft below ground level. These culverts, also of reinforced concrete cast in situ, extend about 600 ft out to sea and the tops are always submerged below low tide level. Ample supplies of water are thus always available. The water is also returned by culverts which discharge 250 yds away from the inlet culverts.

Special precautions had to be taken to prevent flooding by monsoon rains as the power station basement level is at approximately the same height as high spring tide. Two tunnels, each with a cross sectional area of 64 ft and each more than 300 ft long have been cast below ground level. These acommodate the site area rain water which can be pumped out to sea at the circulating water outfall. With mean and low tide conditions rain water drains away under gravity.

Our heading block shows the first two Metropolitan-Vickers machines to be installed

Boiler Plant

Two chimneys each 225 ft high with an internal diameter of 16½ ft are placed symmetrically on the centre lines of Boilers Nos 3 and 7. The foundations for the chimneys consist of a reinforced concrete block 42 ft square by 10 ft thick.

The Babcock and Wilcox boilers are of the high head straight tube header type, with

horizontal self draining superheaters. Steam conditions are 625 lb/sq in. at 825°F.

In the first instance oil fuel will be used for firing purposes and will be supplied to the boilers by individual pumping and heating units interconnected by a common feed header. Should coal burning be adopted in future, Babcock-Detroit Rotograte automatic spreader stokers will be adopted.

The forced draught fans, two per boiler, are powered by 63 h.p. motors, the two induced draught fans being driven by 224 h.p. motors. A further set of secondary air fans rated at 26 hp will be used to inject an additional supply of air into the furnace to promote turbulence and complete the combustion when coal fuel is used.

A single main gas flue, 12 ft by 10 ft at its largest section and 425 ft long will eventually serve all nine boilers.

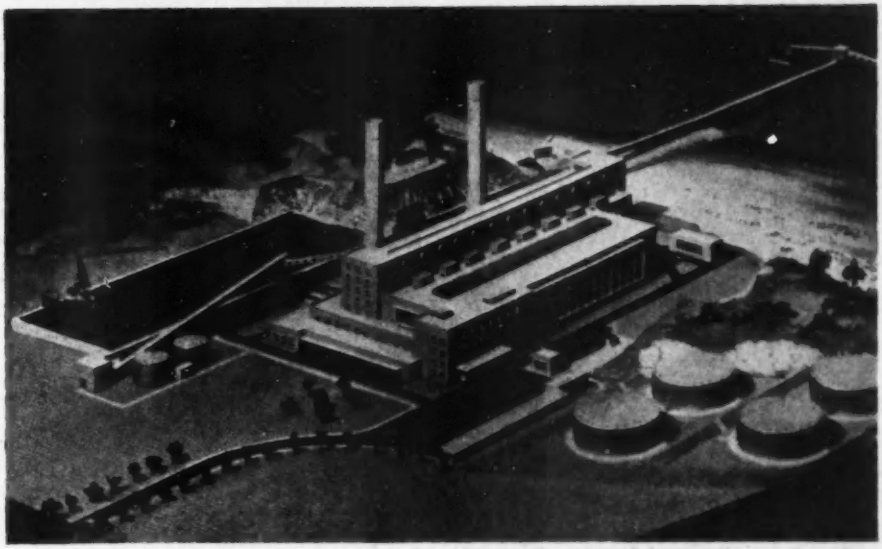
The operation of the boiler plant and its auxiliaries, and the control of combustion conditions can be effected manually or by means of automatic equipment. For this purpose each boiler is provided with a manual and automatic control cubicle having some 70 instruments on the front panel. The superheat control is of the "Attemporator" type and is automatically adjusted to suit the load.

The station design provides for a maximum installed capacity of 152 MW in six 25 MW sets with a gas turbine 2,000 kW Parsons house set. This latter unit is primarily intended to safeguard the auxiliary supply to the main plant in emergency but will also under normal conditions provide a small contribution to the useful output of the station when required.

The steam turbines made by Metropolitan Vickers Electrical Manufacturing Co., are 2-cylinder, single-exhaust machines with duplicate pipes between h.p. and l.p. cylinders. The alternators, generating at 22 kV are directly-coupled to the turbines and have 3,000 r.p.m. direct-coupled main and pilot exciters. Four stage bled steam feed heating is employed using one l.p. heater followed by three h.p. heaters. Seven electrically driven and two steam-driven standby feed pumps will be provided for the completed station.

Switchgear and Cables

As the transmission system operates at 22 kV, no intermediate transformers have been included between the alternators and the outgoing feeders. The 22 kV Reyrolle main switchgear is of the metalclad horizontal isolation, oil-immersed circuit-breaker type with a rupturing capacity of 1,000 MVA and has duplicate busbars. For the power station auxiliary supplies three main transformers each of 3,500 kVA capacity have been provided and feed 6·6 kV switchgear with a rupturing capacity of 250 MVA for supply to 19 stepdown transformers in the station basement. Each of these units, of 750 kVA, supply



This external view of a model of the station shows the modern style architectural treatment

This photograph shows part of the Reyrolle 22 kV switchgear. The installation is positioned immediately above the circulating water pumps in the basement, and the rating is 1,000 MVA rupturing capacity

the various station auxiliaries at 415 volts. The 415 volt supplies are in turn controlled by 25 MVA switchgear associated with the individual motors.

Cables vary in size from 0·7 sq in. for some of the main 22 kV cables down to 0·002 sq in. in the 415 volt group. In the first section some 5,000 ft of 22 kV, 7,100 ft of 6·6 kV and 30,000 ft of 415 volt cable have been run. Outgoing cables for the 22 kV system are taken directly underground, but cables within the station are generally accommodated in asbestos-lined ducts or in floor trenches.

Control

All essential manual and automatic controls are centralised in a room adjacent to the turbine room from which the Engineer in Charge can direct operations throughout the station. Under normal conditions of operation, however, control is effected from switchgear mounted adjacent to plant. Telegraph signal transmitters enable visible and audible instructions to be conveyed from the control room to plant attendants in the boiler house and turbine room, and telephone equipment communicates with all parts of the station and with key points in the Electricity Department's network.

Boiler and turbine boards, indicating and recording steam and water conditions of each individual main generating unit are installed in the control room to provide the station engineer with a day to day record of plant performance and also to give a quick means of calculating plant efficiencies.

The oil fuel for the station is stored in four welded steel tanks, each having a capacity of 8,350 tons of oil. The total capacity of the tanks is equivalent to two to three months' supply for the station under normal operating conditions. Each tank has a diameter of 104 ft and is 35 ft high with the roof entirely supported from the tank walls. The tanks may be replenished from two sources, the normal method will be by ocean tankers pumping the oil from the station's wharf through a 12 in. bore pipe 2,000 ft long. The alternative is by a 10 in. pipe connected to a pipeline running under the Pasir-Panjang road.

Auxiliary Equipment

A 65-ton overhead crane is installed in the turbine room, the crab resting on box girders spanning nearly 80 ft. Automatic limit switches prevent overrunning and an auxiliary 10-ton lifting hoist is positioned on the crab adjacent to the main gear.

The machine tools in the workshop range from a 72-in. surfacing and boring lathe down to a watchmaker's lathe, and also include multispeed drilling machines, punching, plate-splitting and cropping machines. In the laboratory, full equipment has been provided for checking the quality of oil, water, coal, grease, etc., so that the highest efficiency and availability can be maintained.

Four mercury arc rectifiers, two providing 110 V d.c. and two 230 V d.c. supply two batteries which in turn provide the necessary power for the switchgear control and operation. In addition to feeding the 22-kV switchgear section, the 230-volt battery also supplies emergency lighting and the power for starting up the house gas turbine set.

MAIN CONTRACTORS

George Wimpey & Co.	Civil and Building Works.
Metropolitan Vickers Elec. Mfg. Co.	Turbo Generator Plant.
Babock and Wilcox	Boiler Plant and Pipework.
Whessoe Ltd.	Oil Storage.
C. A. Parsons & Co.	Gas Turbo-Alternator.
A. Reyrolle	Switchgear.
Metropolitan Vickers Elec. Mfg. Co.	Transformers.
W. T. Henley's Telegraph Works Co.	Cables.

PROBLEMS AND PRACTICE in Engineering

This Metering Business

APROXIMATELY a year ago a number of self-contained one room flatlets (60) were wired each having one light and one 13 amp socket.

Three single-phase supply meters, t.p.n. mainswitch fuse and three ring main circuits were employed, fused "tee-off," slot-meter and splitter switch fuse being fitted in each room. The slot meter tariff was arranged so that the money collected would equal the supply authority's charges.

At the end of the year the accountants found that the money collected was insufficient to meet the charges. It was suspected that the meters were faulty or insulation leakages occurring. We were asked to investigate and locate the source of the trouble.

It proved rather a long job to check all meters and installations but no fault could be found. Main check meters were then installed and periodic check readings of main and slot meters taken. This proved that the main meters were registering far more than the sum of the slot meters. This was proved to be due to the low demand of a large number of the consumers, coupled with the continuous volt-amps taken by the voltage coils, which far exceeded the metered current. Owning meters can be an expensive business.

—T.A.P.

Careless Carpentry

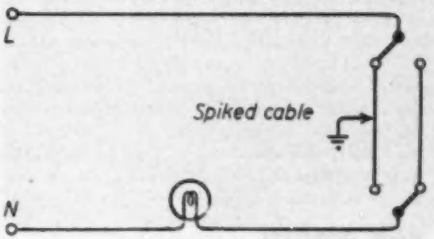
AFTER completing the installation of several houses on a local estate, I received a complaint that a switch was very hot.

On arrival at the house, I found that the lighting fuse had blown, but the discoloration of the switch block certainly established that the switch had been extremely hot.

A "Megger" insulation test to earth on the wiring, gave a very low reading, although on removal of the switch and block I could find nothing to account for the heat.

Having had experience on several occasions, of cable being spiked by carpenter's nails, I next investigated the skirting beneath the switch and, after some probing, found a nail piercing the casing and cable. The installation comprised c.t.s. cable protected down the walls by thin steel casing—the walls being of the hollow brick type which could not be cut away for normal conduit.

The nail and casing, being in comparatively damp brickwork had evidently given a high



Position of nailed earth fault

resistance path to earth, generating heat which had risen up the air duct formed behind the casing and come out behind the switch.

The reason why a low test had not been obtained when the installation was connected by the supply authority, must have been due to the fact that the pierced cable, being one of a pair of 2-way commons, must have been out of circuit at the time of testing, although the possibility of anything similar occurring is rather remote, it does bring to light the advisability of reversing 2-way switches when testing an installation.—*W. Satchwell.*

Extension Clip

A HANDY gadget with many uses may be conveniently made from a crocodile clip by brazing one leg to a handle made of stout wire. A piece of this wire is then secured to the other leg and passed through a clearance hole in the first leg. By pulling the free end of this thin wire it is possible to open the jaws, the latter of course being closed by the spring of the clip. The device is particularly useful for inserting screws into inaccessible holes, as the screws are actually gripped by the jaws and so there is no fear of their being dropped. Another application is to hold wires while they are being soldered into place. The arrangement for opening the jaws also enables the tool to be used for picking up small parts which have fallen into a restricted place.—*P. K.*

Overload Protection for Domestic Appliance Motors

AMERICAN RULES AIM TO ELIMINATE BURN OUT

IN recent years there has been an interesting development in the field of domestic appliance protection in the United States. An increasing number of motor-driven appliances has been required, under the requirements of the Underwriters' Laboratories Inc., to be fitted with overload protection devices of some kind, additional to fuses. The reasons behind this change, and the direction it has taken, are discussed in an article in this month's "Electrical Engineering," the journal of the American I.E.E.

Fire Analysis

Reports covering the analysis of fires occurring through 31 large cities of the United States during 1951 showed that 32·7% of the fires of electrical origin were due to motor burn outs. Obviously something was possible to avoid this. It is recalled that a somewhat similar situation existed several years ago with the electric smoothing iron. At one time it was responsible for more electric fires than any other electrical appliance. Now that the fitting of a thermostat is common, less than 2% of the total of electrical fires in the U.S.A. are caused by smoothing irons.

Fuses No Answer

Taken as a whole, motors used in domestic appliances are of the type whose starting currents are from six to eight times the normal full load currents. Under conditions of overload, slow acceleration, or long time operation on starting windings the motor current, and the consequent heating rate is likely to be far higher than the designed running value. If fuse protection only is provided, this will be ineffective in such conditions, because the fuse must be rated to pass the starting current. As is well known, this means in the result that the fuse affords only short-circuit protection.

In general, additional protection may be provided either by an overload device mounted on the appliance — but not necessarily on the motor—or by a temperature responsive device incorporated directly in the motor which is to be protected.

In deciding on the need for either American laboratories give attention to the use to which the appliance is to be put. A hazard is considered to exist if, in any running position the temperature on the coil of any open type motor or the enclosure of a totally enclosed motor exceeds 125° C; or if temperatures exceed 150° C on motors of portable appliances; or if under any stalled rotor condition the temperature of the coils of an open-type motor or on the enclosure of a totally enclosed motor is more than 150° C.

Care is taken that the installation of an overload protective device does not introduce new dangers. For instance, if an automatic reset type of device is used the automatic restarting of the motor must not cause danger to users. Further, no nuisance tripping must occur due to the protecting fuse being blown, and the protective device must not ignite combustible material when subjected to a short-circuit limited to 200 amps for a motor of ¼ h.p. or less, operating at 250 volts or less. (1,000 amps for over ½ h.p. or over 250 volts.)

Protected Appliances

So far appliances for which motor protection has been required are: kitchen waste disposal units, dish washers, attic ventilating fans, washing machines, refrigerators and oil burners. It is considered that the kitchen waste units are subjected to overloads under normal operating conditions. They are manually controlled and are usually fitted with short-time duty motor. On automatic dish washers, protective devices limiting the motor winding to a temperature of 125° C are required only if the likelihood of overloading is demonstrated: otherwise only protection against stalled conditions is required.

The requirement of overload protection does not extend to every appliance, of course. A non-automatic motor-operated appliance within sight of the operator is not considered to present the same potential risk as an automatic or remotely installed appliance, even if subjected to considerable load variation.

Reinforcement in the North West

NEW SUBSTATION FEEDS NORTH CHESHIRE FROM CARRINGTON

OPENED last week by the Mayor of Altrincham, the new Broadheath sub-station of the North-Western Electricity Board epitomises many of the advantages that have followed from the abolition of local undertaking boundaries in electricity supply. The Altrincham area which has previously been supplied by 33 kV lines from Stockport, about eight miles away, will now take a 132 kV supply from the new power station at Carrington, which is distinctly nearer. It is hoped that the power station will be in commercial operation by September.

Increased Demand

A steadily increasing demand for electric energy in north Cheshire has made the provision of some reinforcement a matter of urgency. Close co-operation between the Board and the North-Western Division of the B.E.A. has been necessary during the four years that have been occupied by the planning and construction of the project. On the lower voltage side, the work is being accompanied by a progressive change-over from an existing 2 kV system to a standard 11 kV system in the Altrincham district, which is enabling unpopular restrictions on the use of electricity to be lifted at last.

Commissioning of the sub-station has naturally resulted in an extensive re-organisation of existing supply arrangements. Previously the supply had been obtained via Wood Lane, Timperley, from the extensive 33 kV Cheshire ring, which supplies Knutsford, Alderley Edge, Macclesfield and Marple from the Stockport generating station. Now the 33 kV cable between Timperley and Broadhurst is being used in reverse, the Wood Lane switch-house being fed from the new sub-station. The two 33 kV overhead lines which connected Wood Lane to Stockport are being diverted from Stockport and used to supply Cheadle, while the 33 kV line which ran from Wood Lane to Knutsford will in the future be diverted from Knutsford to feed Manchester's new industrial estate at Moss Nook.

Super Grid

Eventually the Broadheath sub-station will be connected indirectly with the 275 kV Super Grid, for it is planned to connect this with the 240 MW capacity Carrington generating station.

There is one old-time note in this most up-to-date story. Fifty-five years ago, when the Altrincham generating station was being built, the remains of a Roman road were encountered, and proved so solid that the station chimney was built directly on them. The foundations of the new sub-station have, in turn, been built on those of the old chimney at one point.

overseas news

Power for Prospectors

Bearing such a modern name as Uranium City, this small town in Saskatchewan should have the very latest ideas in power plants, one would imagine, now that the 400 odd prospectors in the area are becoming settled in. The Uranium City Power Co. Ltd. has been established, and granted a franchise to construct a generating plant and the necessary distribution system. The type of plant to be installed? Diesel-engine driven.

Alaska Scheme

A project scheduled to supply 34,000 kW to the Railbelt section of Alaska, the Eklutna plant is nearing completion, we learn. Work is now progressing rapidly on construction of the four-mile tunnel through Goat Mountain. The tunnel will carry the water to a plant being erected along the Glenn Highway, between Anchorage and Palmer. The project, which will utilise the waters of Lake Eklutna, was the subject of much discussion in the U.S. Congress when the Federal Bureau of Reclamation requested an increase in its funds to permit the scheme to be completed. Work on the tunnel is being done from both ends. The south end which starts at the power plant site, is going forward at the rate of 55 ft daily, while the lake end is moving into the mountain at a rate of about 35 ft a day.

McNary Dam Tenders

It is reported from Washington that the American Department of the Interior has rejected two foreign bids for electrical equipment. The rejected tenders were for six 345,000 V transformers required in connection with the McNary Dam project. The contract has been awarded to the Allis-Chalmers Manufacturing Co. who quoted at $2,005,378. We understand that one of the rejected tenders was put in by Ferranti Ltd., and was some £168,286 lower than the accepted tender, and the other came from the Austrian firm of American Elin Corporation, which was lowest of all. A bid for other equipment from the Nippon Kaisha Co., of Nagoya, Japan, was also accepted. Only reported comment of the American authorities on the rejected quotations, was that they did not meet the specifications.

Atom Power for Norway

The joint Dutch-Norwegian research establishment at Kjelier plan to build an atomic reactor with a power plant, using natural uranium in rod form, and heavy water. This information was given at a three-day conference of nuclear physicists at Oslo last week by Dr. Gunnar Randers, the Norwegian chief of research at the Atomic Institute at Kjeller, near Oslo. The new plant is estimated to cost over 25 million kroner. Dr. Randers also gave it as his opinion that atomic energy plants for industrial power could be practicable propositions, and that the cost could be kept to within reasonable limits.

Sola Power

The new hydro-electric power station which has been built on the River Sola in Porabka (Cracow voivodship), Poland, will soon be put into operation. This is the first power station of its type to be wholly designed by Polish engineers, we gather. Work has begun on raising the level of water in the reservoir which was built before the war and on deepening the Sola.

An Austrian Scheme

A large hydro-electric project is to be constructed in the Tauern mountains, in Austria's East Tyrol, we learn. Much of the necessary finance will be provided by Italy, according to a report of a meeting in Paris of delegations from the countries concerned. It is stated that the new station, to be situated at Dorfertal-Huben, would produce 220 million units during the winter, when it is most needed, and power would be supplied to North Italian industries. The agreement provides that part of the Italian credit balance with the World Bank shall be used to finance this scheme, and the Austrian Ministry of Transport would provide a third.

New Tariffs for Cyprus

A new tariff rate put into operation this month by the recently-formed Electricity Authority of Cyprus has not met with a very warm reception even though the unit charges are lower. In fact the consumers' reaction has not been at all favourable, we gather. The trouble, it seems, is that whereas the smaller consumers have been paying 6 piastres per unit, they expected that under nationalisation of the industry the rates would be only about half that amount. The realisation that this would not be so came after a meeting of local press reporters, when Mr. J. O. Hall, chief engineer and manager of the Electricity Authority of Cyprus, and Mr. J. F. C. McIlwain, chief accountant, gave details and explanations of the new charges. For domestic supplies there is a flat rate of 4½ C. piastres per unit, plus a meter rental or a two part tariff with a charge of 15 piastres per month per room (minimum two rooms) plus 2 piastres per unit. Mr. Hall pointed out that only consumers with the smallest consumption

would not benefit under the new rates. Obviously the intention is to promote domestic electrification on the island. We have previously referred to the scheme prepared by Preece, Cardew and Rider, consulting engineers, for a 70 MW generating station and an island-wide transmission system. Much of the latter is already in operation, and the first stage of the new power station is nearing completion although two sets have been in commission for some months.

Kafue will be First?

Confirmation that the Kafue Gorge hydro-electric scheme will be proceeded with before the Kariba project, was given recently by Mr. W. A. E. Winterton, Southern Rhodesia's Minister for Trade and Industrial Development. He was speaking at the annual conference of the Rhodesian Federated Chambers of Commerce. Agreement had been reached with the Northern Rhodesia Government, he said, that the smaller hydro-electric scheme at Kafue Gorge would be financed from sources outside those normally available to the Federal Government and when the Kafue scheme was completed between 1957 and 1959 Northern Rhodesia would give full backing to the Kariba Gorge scheme. Meanwhile, investigations at Kariba, on which £156,000 had so far been spent, would continue. Later the delegates rejected a resolution asking the Government to limit expenditure on the Kariba Gorge hydro-electric scheme after Mr. Winterton emphasised that industrial development depended on cheap power and that the cost of thermal power stations would tend to rise as increased coal traffic would necessitate heavy capital expenditure by Rhodesia Railways. The latter, in consequence, would probably have to raise the freight charge for transporting coal to power stations. It had been estimated that over the next 10 or 12 years the cost of expansion of the thermal generating plant, apart from hydro power, would be over £40 million.

Studying Aluminium Production

Off for a 4-day visit to Canada next month is a delegation of Gold Coast Government Ministers and members of the National Committee for the Volta River project. The visit is in order to study installations for the production of power and aluminium, several of the plants of the Aluminium Co. of Canada (including those under construction), being the chief objectives. Later in the month the party will spend six days in the United Kingdom studying various aspects of aluminium production in Britain, before returning to the Gold Coast.

A Plan for Cape Town?

While the question of the future power supply of Cape Town is still under discussion, a proposal has been put forward for the construction of a ship canal linking Table Bay with False Bay alongside which future power stations of the Cape might be located. The proposal has come from Major A. Z. Burman, Chairman of the City Council's Finance Committee and himself a member of the Special Committee which is investigating the city's future power station needs. Such a canal, he maintains, would enable coal for the power stations and raw materials for industries to be brought by barges, and the power stations would be able to use the canal sea water for cooling purposes. Although no estimate of such an undertaking has been made, Major Burman expresses the opinion that it should not exceed £1,000,000 and that plant would be available to undertake the work when the City Council's £6,000,000 Wemmershoek water supply scheme has been completed. Apart from this proposal, owing to the difficulty of raising fresh capital for major schemes, there is a possibility that the City Council may suggest the installation of a fifth and sixth turbo-alternator set at the new Salt River "B" station and so enable the Council to have more time to deal with the problem of whether to build its own generating station or rely on the Electricity Supply Commission of South Africa for future supplies of electricity.

Employment

India's Lower House of Parliament has approved legislation empowering the Government of India to collect statistics from foreign-owned and foreign controlled firms on the employment of Indian personnel and on trade with outside countries. The purpose of the Bill is to enable the Central Government to assess the extent to which local people are employed by foreign-owned concerns and to ensure that a reasonable number of Indians are given an opportunity at all levels of the companies' management.

Looking after the Consumer?

In Tasmania, the Parliamentary Liberal Party has been concerned for some little time at what it terms the "over-development of hydro-electric resources," it being pointed out that out of a £17 million budget, a total of £14 million is being spent by the State Hydro Electric Commission. It is now suggested that the Party should go a stage further and try to restrain the Government from allowing the Hydro-Electric Commission to enter into fresh contracts with Government-assisted industries until the domestic consumers have all the electricity they require.

Maraetai Opening

The official opening of the Maraetai hydro-electric station on the Waikato River, New Zealand, will take place on September 5. Three of the proposed five 36 MW generators are now operating, and the remaining two will be in commission next year. A full description of this station was given in our June 11, 1953, issue by Mr. P. W. Blakeley, A.M.I.E.E., A.M.N.Z.I.E., of the State Hydro-Electric Department.

PERSONALITIES

IN THE INDUSTRY

Mr. E. L. Pearce, ASSOC.I.E.E., station superintendent at Watford generating station, Eastern Division, B.E.A., has been appointed to a similar position at the Division's Norwich power station to succeed **Mr. D. H. Brown,** A.M.I.E.E., who is retiring at the end of October. For Mr. Pearce it will be a return to the city where he has previously served for two periods with the former Corporation electricity undertaking. He served an apprenticeship in Cornwall and subsequently spent a year at Norwich as engineer's assistant. Later he went to Aylesbury, but returned to Norwich in 1930 as control room engineer and stayed until 1947, serving successively as charge engineer and shift charge engineer. He then went to Croydon power station as shift charge engineer, and on nationalisation of the industry, was appointed superintendent of the power stations at Guildford and Woking, before taking over his present duties at Watford in 1950. Mr. Brown has been power station superintendent at Norwich since 1940. He served his electrical apprenticeship with Bruce Peebles and Co. Ltd., and a mechanical apprenticeship with Brown Bros. Ltd., Edinburgh. He subsequently held appointments in Edinburgh, Birmingham, London, Yorkshire and Nottingham before going to Norwich in 1935. Our readers may recall that Mr. Brown was co-author, with Mr. F. W. Dale, of an article on 'Lost Wagon Time,' published in our issue of March 6, 1947, in which he asserted that millions of wagon-days were wasted in delivering coal to power stations, refuting the suggestion of Mr. Shinwell, then Minister of Fuel and Power, that the 1947 fuel crisis was due to a shortage of railway wagons.

Mr. E. L. Pearce

We learn that **Mr. R. B. Pearson,** A.M.I.Mech.E., A.M.I.E.E., M.Inst.F., has been appointed power station superintendent of Blackburn Meadows. Mr. Pearson was in 1948 maintenance engineer (electrical) at Huddersfield and in December of that year took on a similar position at Deptford East. In August 1950 he became shift charge engineer at Blackburn Meadows, and in November 1951, was appointed station superintendent at Barugh, Barnsley and Wakefield power stations.

Mr. A. E. Bagg, has left Industrial Guarding Equipment Ltd., to take up his appointment as managing director of Press Guards Ltd.

Mr. J. C. K. Shipp, B.Sc., A.F.R.Ae.S., M.I.Ae.S., has recently joined the English Electric Co. Ltd. from the Ministry of Supply to become the group's aviation representative in the U.S.

Mr. J. W. H. Robinson, has been promoted to the position of borough electrical engineer at Whangarei, New Zealand, in succession to **Mr. W. J. M. Dawson,** M.I.E.E., A.M.N.Z.I.E., who has retired after holding the position since 1916.

Mr. H. B. McAuslan has been appointed resident representative of the Brush Group in India, Pakistan and Burma. He will be travelling to India to take up his new duties at the end of this month. He has also been made a director of Associated British Oil Engines (Export) Ltd., O.B.O.E.X., National Oil Engines (Export) Ltd., N.O.E.X. and Brush Export Ltd.

Mr. G. C. R. Eley, C.B.E., a director of the Bank of England and a number of important companies, has accepted an invitation to become a director and deputy chairman of the Brush Electrical Engineering Co. Ltd. In addition, **Major Noel F. Webster,** O.B.E., M.C., M.I.Mech.E., who is president-elect of the Institution of Mining Engineers, has joined the board of the company.

The Plastics Division of E. K. Cole Ltd., announce the appointment of **Mr. J. Buckingham** as technical sales representative for the North East area. He had earlier experience with Joseph Lucas Ltd., as a plastics mould designer and with B. X. Plastics Ltd. as a technical sales representative.

We learn of two recent changes in the representation of the Electrical Fair Trading Council. For E.L.M.A., **Mr. C. J. W. Scott,** executive director and general sales manager of Crompton Parkinson Ltd., takes the place of Mr. N. V. Everton, and for N.E.C.T.A., **Mr. W. T. Trace,** immediate past-president of the E.C.A. and a director of the electrical contracting firm at Liverpool and Birkenhead, takes the place of Mr. T. E. Alger.

Nominated as Manager in India (and responsible for the branch office there) to the Brush Electrical Engineering Co. Ltd., is **Mr. A. L. Cramb,** M.I.E.E., who joined the group in August, 1946, as technical manager in India. In November 1950, he became sales promotion manager in India, Parkistan and Burma for Brush Power Engineering Ltd., and in July, 1951, he was appointed representative in India, Pakistan and Burma for the Brush group. He served an apprenticeship at the Trafford Park works of Metropolitan-Vickers Electrical Co., and spent a further three years with that company as a junior erection engineer on turbine, large transformer and switchgear erection. During the war he served in the Royal Navy as an engineer officer, being mentioned in despatches. Mr. Alan Lindsay

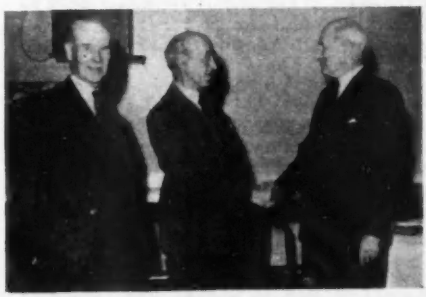
Cramb, by the way, is the only son of Mr. A. C. **Cramb,** M.I.E.E., M.I.Mech.E., whom many will remember as a former director and secretary of E.D.A., and previously as chief engineer and manager of Croydon Corporation Electricity Department.

Appointments for the positions of station superintendent at St. Helens and deputy station superintendents for Bold and Connah's Quay power stations have now been made as follows: At St. Helens, **Mr. Charles B. Duncan,** A.I.E.E., A.I.Mech.E., who was previously deputy superintendent at the station, is appointed superintendent as from August 1. **Mr. Henry L. Davies,** A.M.I.E.E., previously shift charge engineer at Upper Boat in the South Wales division, is appointed deputy station superintendent at Bold as from September 1 and **Mr. Alan F. Vowles,** A.M.I.E.E., previously turbine house superintendent at Ferrybridge (Yorkshire Division) is appointed deputy station superintendent at Connah's Quay as from September 13.

The position of district engineer for the Forest of Dean district of the Midlands Electricity Board has been filled as from August 1, by **Mr. R. L. Evans,** A.M.I.E.E., previously first assistant district engineer of the Stone district of the North Staffs sub-area. Mr. Evans served his apprenticeship with Power Centre Co., and Henry Peace. He was then employed with William Sanders (Wednesbury) Ltd., until 1946, when he joined the Crewe district of the then North Wales Power Co. In 1949 he was appointed assistant district engineer of the High Peak district of the Stockport sub-area, where he remained until 1950 when he moved to the Stone district.

The retirement of **Mr. E. C. McKinnon,** M.I.E.E., on July 31, marked the termination of over sixty years' continuous employment with The Chloride Electrical Storage Company. For many years he was chief engineer of the company, having previously been draughtsman, chief erector and head inspector. In the latter capacity he visited both Russia and Scandinavia.

He has been an active Member of the I.E.E. for many years and was for one year, Chairman of the North Western Centre. He read two papers, for one of which he was awarded an honour, and for three years served on the International Electric Standardisation Committee. His book "The A.B.C. of Storage Battery Management" has had a world wide circulation.



Mr. McKinnon with Mr. A. W. Browne, chairman of Chloride Batteries Ltd. (right), and Mr. W. S. Naylor, director and past-chairman of the Co. (left)

Sangamo Weston Ltd. announce the appointment of **Mr. A. H. Springer,** A.M.I.E.E., to the board of the company. Horace Springer joined Sangamo Weston in 1932 and after holding various positions in the Production and Contracts Department, was appointed contracts manager a year ago. Before joining the company he served a five years' engineering course at Johnson and Phillips Ltd., Charlton.

Mr. A. H. Springer

We understand that as from September 1, **Mr. L. M. Squires** has been appointed manager of Dormor and Co., Wholesale Electrical Supplies of Haviland Rd., Boscombe, Hants. Mr. Squires was formerly with the Southern Electricity Board at High Wycombe and has been connected with the supply industry for some thirty years. He began his career with the Letchworth Electricity Undertaking.

The directors of Submarine Cables Ltd., owned jointly by Siemens Brothers and Co., Ltd., and the Telegraph Construction and Maintenance Co., Ltd., announce the appointment of **Mr. W. G. Patterson,** M.B.E., M.I.I.A., deputy managing director of Siemens, to the board of Submarine Cables Ltd., in place of **Mr. S. W. Lumb,** F.A.C.C.A., secretary of Siemens, who has been appointed an alternate director to Mr. Patterson. The latter is also a director of Siemens Electric Lamps and Supplies Ltd., and Alfred Graham and Co., Ltd. He has been with Siemens for about 36 years.

Mr. W. G. Patterson

It is announced by the S.W. Division of the B.E.A. that **Mr. J. Fisher,** M.I.E.E. at present power station superintendent at Bath, has been appointed to the post of deputy power station superintendent at Portishead "A" generating station. Mr. Fisher has held his position at Bath since 1941, and prior to that was for three years engineer in-charge of the Borough of Croydon generating station. Mr. Fisher succeeds Mr. A. G. Amery who is retiring after the completion of 34 years' service in the electricity supply industry.

We are informed that **Mr. A. E. J. Walker**, A.M.I.E.E., has been appointed sales manager to British Electric Lamps Ltd., in succession to Mr. A. F. Brown who recently resigned for health reasons. Mr. Walker was previously with Newey and Eyre Ltd., and was at one time Birmingham Branch Manager for Siemens Electric Lamps and Supplies Ltd.

Now appointed as an assistant engineer with Roan Antelope Copper Mines Ltd., is **Mr. G. L. Hunter** B.Sc., Grad.I.E.E., younger son of Mr. N. Hunter, M.I.E.E. of the North Eastern Electricity Board. He sailed for Northern Rhodesia to take up his position last week.

Miss O. M. Forbes, M.B.E., resigned her position as lady superintendent of the welfare and women's employment at Ferranti Ltd., last month. She joined the company in 1915 and in collaboration with Mrs. G. Z. de Ferranti engaged the first girls to start work at the Hollinwood Factory. She was awarded the M.B.E. in the New Year's Honours List of 1950.

OBITUARY

It is with regret that we have to record the death on August 13 of **Mr. L. A. Woods**, senior representative of the G.E.C. Edinburgh Branch. Mr. Woods had served with the G.E.C. for a period of over 31 years.

NEW LITERATURE

Circuit Breaking

by H. Trencham, M.I.C.E., M.I.E.E.

WHEN, in the spring of last year, a course of six lectures on circuit breaking was given by a team of E.R.A. research workers, together with Mr. Trencham, it was discovered that a far greater demand for information on the subject existed than had been expected. In fulfilment of the obvious requirement, this excellent book has now been produced. In it is given the substance of these lectures suitably presented under the general editorship of Mr. H. Trencham, the only member of the team who was at the time not a research worker with E.R.A.

The main attraction of the work lies in the detailed accounts given by the authors—Dr. Whitney, Mr. Morris Cassie, Mr. Gosland, Dr. Bruce and Mr. Mason—of their research work into the fundamental phenomena of circuit-breaking. Although the book has been primarily produced for practising design, system planning and operating engineers, its clarity and general interest are so good that it should be read by every serious student of the subject, and certainly by those students who hope to make research their career.

Little is given on the design of circuit-breakers as mechanisms; the whole text centres round the electrical phenomena which occur between the separating contacts and the methods adopted to investigate these phenomena. The effects of circuit constants on the system are also included.

A general discussion of the work and the particular importance of the E.R.A. organisation is also included in the chapter by Mr. Trencham which concludes this excellent work. Published by Butterworths Scientific Publications, 206 pages. Price 30s.

Small Motors and Transformers

edited by E. Molloy

OCCASIONALLY it suits the engineer or the model-maker to build a small motor or a transformer to fit his special requirements; more frequently he may wish to rewind an existing machine for a different voltage. This book will tell him how to do it, largely by rule of thumb and the help of some generalised design tables. Obviously such a volume has many technical limitations, but this one has a great merit measured against its intended use: it gives the closest attention to the practical details of the mechanical tasks involved. Published by Newnes, 176 pages, 8½ in. by 5½ in. Price 15s.

Permanent Magnets

A GREAT deal of factual information about contemporary permanent magnet materials and their use is packed into this slender volume. Theory, so important to the development of high energy magnetic materials, is here thoroughly subjugated to practice. The result is a collection of data and advice which cannot fail to help and interest the student and which will be doubly welcome to the designer who has to use magnets. Apart from a number of tables and curves set out to be of the greatest assistance in design, there are brief notes on the theory of magnetism and the principles of design, a discussion on methods of magnetising and testing, and some information on the effects of heat and of mechanical shock on magnets. Published by the Permanent Magnets Association, 301, Glossop St., Sheffield 10, 58 pages, 10 in. by 7 in. Price 10s.

BOOKS RECEIVED

Introduction to Valves, by R. W. Hallows and H. K. Milward. Principles of operation of radio valve and its use in circuits of various types. Published by Iliffe and Sons, 152 pages, 8½ in. by 5½ in. Price 8s. 6d.

Television Engineering—Vol. 1, by S. W. Amos and D. J. Birkinshaw. First volume of textbook series primarily for the B.B.C.'s operating and maintenance staff at student level. Published by Iliffe and Sons, 302 pages, 8½ in. by 5½ in. Price 30s.

Electric Traction Economics

French Experience Shows Savings in All Fields

ADDED force to the arguments—which have now been put forward for decades by advocates of electric traction—has now been given by M. Tessier of the Research department of French National Railways.

Speaking at Copenhagen he reiterated the five basic advantages which are (a) saving in traction costs by improvement of thermal efficiency at the drawbar from 5·4 to 12% (b) instant readiness and greater operating efficiency of the electric locomotive, (c) reduction in maintenance costs, (d) saving in capital costs and depreciation and (e) improved service and amenities.

M. Tessier's remarks were all the more interesting as they were founded on the experience of the large scale electrification programme which has been going through in France during the past few years. The coal savings in France were considerable, as hydro-power could be used. This provided an additional saving over the normal saving of high grade coal which could be made in countries dependent on thermal power sources. In France, therefore, the annual saving on coal was about 3·1 million tons, and in terms of money, the cost of traction energy was reduced by 50-60% in the traffic conditions prevailing on the French railways selected for electrification.

Savings over Steam

Operation and maintenance were eased because of the saving in labour due the state of continuous readiness of the locomotives, and the fact that in many cases the locomotive could be one-man driven. The actual maintenance cost had been reduced from 90-50 francs per km to something between 22-16 francs per km according to the type of locomotive. This saving was due to the longer periods between overhauls which were possible.

Savings in capital cost occurred because an electric locomotive could perform the work previously carried out by three steam engines, while the first cost of the electric tractor was twice that of its steam counterpart and moreover this first cost was likely to fall as more engines were produced. The improved service available with electric traction was well exemplified by the operation of the Paris-Lyons line. On public holidays, 50 express trains left Paris between 6 p.m. and midnight, some of them following each other at 2 minute intervals at speeds up to 140 km/hr. Up traffic to Paris was equally bunched and for that reason the two track system near Dijon was signalled for both way operation. Experience on this line had shown a saving in working expenses of over 50% and an overall saving, after deduction of capital costs of 7%.

Although at the moment railway electrification in France was confined to 10% of the route mileage carrying 30% of the traffic, it was to be extended to lightly loaded sections.

Here it was proposed to adopt 20 kV 50 c/s single-phase instead of the more usual 1,500 volt d.c. locomotives. Owing to the elimination of rectifier substations and the reduced cost of the overhead system, the first cost worked out at about 35% less than that for 1,500 volts d.c. and the locomotives were now no more expensive than the d.c. units.

FRACTURE OF MILD STEEL

Brittle fracture in mild steel has always been a cause of concern to the structural engineer, and with the large scale introduction of welding techniques the problem has become of major importance. This is partly due to the fact that a riveted structure can give slightly under stress, whereas a welded structure is more rigid.

Although the effects of brittle fracture have been well known, it is only recently that a systematic research programme has been undertaken on the subject. Starting with pure iron, the National Physical Laboratory has been investigating the phenomenon in great detail. It has now been discovered that the temperature of transition (when the metal changes from ductile to brittle structure) can be greatly altered by changes in the carbon oxygen and nitrogen contents of the metal, although most metallic elements make little difference, even in quantities of up to 5%. An exception to this rule is manganese which reduces the transition temperature to a useful extent.

D

Automatic Acceleration

All-electric Control for Trolleybus Use

WITH the amount of power available in the overhead supply system, the control of trolleybus acceleration has always presented a difficult problem and many solutions have been found and marketed.

One of the latest devices in this field is a new type of automatic acceleration regulator designed and developed by the British Thomson-Houston Co. Ltd., and which is being fitted to the 40 B.U.T. trolleybuses under construction for the Transport Board of Auckland, New Zealand.

The requirements leading to this development are: (*a*) full control over all accelerating points; (*b*) freedom from hydraulic or pneumatic mechanisms; (*c*) speedy reapplication of power at speed; (*d*) ability to control acceleration under extreme conditions of load and gradient; and (*e*) attachment to existing equipments with a minimum of modification.

The assembly consists only of the control unit itself, operating rod, two current relays and controlling resistor, with a spring-link interposed between the driver's power pedal and the operating arm of the master controller. The regulator is independent of the normal control equipment.

If the master controller is retarded by the control unit, to which it is connected by the operating rod, the spring-link is compressed and thus stores energy which is allowed to be used in moving the master controller at a rate determined by the control unit. The relays determine whether the control unit is to allow slow or fast movement of the master controller, or whether movement is to be stopped altogether.

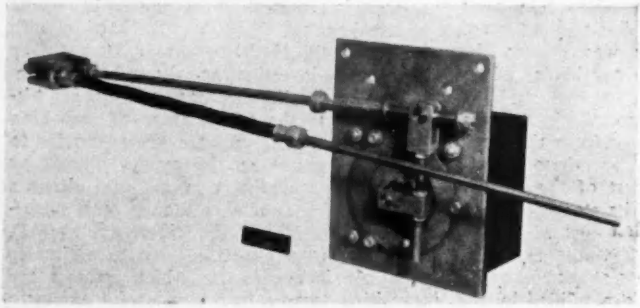
The control unit consists of an eddy-current brake with a special magnetic locking feature, the rotor being geared up from an adjustable lever coupled to the operating rod.

With normal coil excitation the rotor runs at a steady speed under the influence of the spring, but if excitation is increased suddenly the locking feature stops it almost instantaneously. Reduction of excitation to the former value permits resumption of rotation. The gear spindles run in Oilite bushes, and a free wheel mechanism permits movement toward the "off" position without hindrance from motor drag.

Relay Operation

A secondary spring link incorporated in the operating rod provides "lost motion" between the "off" and "first-notch" positions to ensure that rotation of the control movement starts at the first-notch position. This link becomes "solid" during subsequent notching. The two relays carry current proportional to the traction motor current, one being set at a value less than normal first-notch current and the other at a much higher value. The contacts on the "first-notch" relay connect the excitation coil circuit to the battery and the second relay shorts out a series resistor in this circuit, thus giving full excitation and locking the control in the event of overcurrent. This facility permits starting on steep grades and gives a definite current limitation while ensuring a satisfactory start. When notching up at speed after coasting, the "first-notch" relay will not close and the controller operates rapidly as only rotor inertia has to be overcome.

The operation of the unit thus depends only on the setting of the series resistor in the relay circuit, which is readily adjusted.



The assembly of the contro unit is shown here. Note the main spring link operated by the driver's pedal and the secondary spring link which provides the "lost motion" between off and first notch position. The small size of the actucl operating mechanism is well shown by the adjoining scale of 2 in. length

LIGHTING for TRAVELLERS

Modified fitting for Travel Centre

WELL-CONCEIVED application of both tungsten and fluorescent lighting lends character to the British Railways Travel Centre in London, which was opened a short while ago. The Centre occupies a corner position, and most of the street frontage is windowed to show the air-conditioned and brilliantly lit interior.

The main public area has an illuminated louvred ceiling, lighted by fluorescent units placed above it. Surrounding areas have acoustic plaster ceilings with tungsten lights spaced in a regular pattern. These give a slightly lower intensity of lighting, with the result that the attention of the passer-by tends to be drawn to the central area where ticket and reservation counters are situated.

Because the frontage on to Regent Street (the more important of the two roads concerned) is comparatively narrow, the ceiling with its pattern of lighting units has been brought out to the edge of the fascia. This keeps to a minimum any obstruction by piers and walls, and gives an impression of greater breadth.

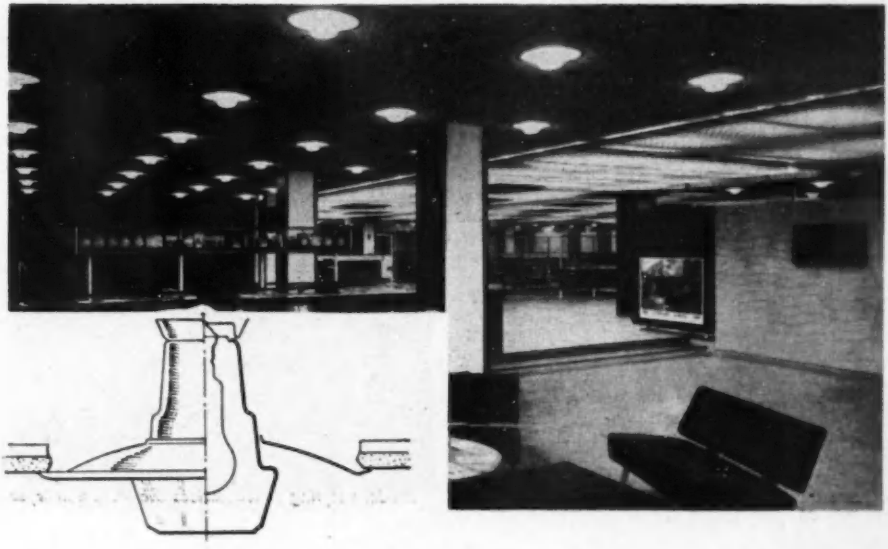
Messrs. Falk Stadelmann, who were responsible for the lighting fittings, supplied tungsten lighting units in which features of a standard "Falks" contemporary design are combined with special features required by the architect. The reflector is arranged with a fixing bezel, and the upper portion of the spinning finishes half-way between the first and second step of the glass unit. Each fitting accommodates a 150 watt lamp and provides a 45 degree cut-off from the downward vertical.

Fluorescent Units

Four foot and two foot fluorescent units housed behind the louvre-all ceiling, and ancillary tungsten fittings for the rest rooms and kitchen were amongst other equipment supplied by Falk, Stadelmann and Co.

The design of the ventilating, heating and lighting installation at the Centre was the responsibility of Mr. F. C. Foreman; the electrical contractors concerned were N. G. Bailey and Co. Ltd. The design of the Travel Centre was carried out under the direction of the Architect to the Railway Executive, Dr. F. F. C. Curtis, A.R.I.B.A.

Inset in the general view of the travel centre below, is a drawing and section of the modified tungsten filament lamp fitting used for the inset lamps which surround the main public area



The BUYER'S *Column*

For the Dark Days

THE dark autumn and winter days may seem far off at the present moment, but to the electrical retailer now is an opportune time to consider his future sales of such useful items.

A new two-cell focusing torch has just been introduced by the GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, W.C.2. Designed for ease of service, it incorporates a detachable switch with safe flash and fixed light positions, while the bulb mounting assembly is easily removed. Made of brass throughout, and chromium plated, it is 7¼ in. long and 1½ in. dia., the head diameter being 2⅜ in. It takes two 1½ V batteries. List price of the BA262 torch is 11s. 3d., plus 1s. 10d. purchase tax.

A separate version, known as BA262C, is available for the special conditions which occur in

A torch for long service

cinemas, where a torch receives heavy use and where the focusing head is liable to be worked loose by constant movement in a short time. For this model, the list price is 11s. 9d. plus 1s. 11d. p.t.

Small Diesel Generator

DESIGNED to fill the need for a small diesel-driven generating plant, the Dale 1,250 W a.c. model, manufactured by DALE ELECTRIC (YORKSHIRE), LTD., Electricity Buildings, Filey, East Yorks, is reasonable in first cost and economical to run and maintain.

Fitted with a Petter single-cylinder, direct injection diesel engine developing 2½ b.h.p. at 1,500 r.p.m., the model will run for approximately 10 hours on one gallon of fuel oil. The cylinder of the engine is of special cast iron and has deep finning to provide adequate cooling, the flywheel also acting as a centrifugal fan.

The self-excited generator is of the drip-proof, fan ventilated type. It is fitted with starting and charging windings and is tropically insulated. Drive from the engine is by vee ropes.

Brook's Limit Switch

A NEW ball-headed plunger-type limit switch embodying several interesting design features, is the latest product of BROOK MOTORS, LTD., Empress Works, Huddersfield. Having about half the number of parts normally used in such a switch, the Brook LS52 promises trouble-free service. Captive fixing screws are fitted in the cover of the die-cast case, and the clamp-type terminals are easily accessible. A rubber gasket makes the unit impervious to surrounding conditions.

Plunger type Limit Switch

Heavy silver contacts are incorporated, and there are two circuits, one make and one break. The operating plunger carries a steel rotating striking ball which enables the mounting position to be independent of the travel of the striker nose. The switch is rated for controlling circuits up to 660 V. Dimensions are 4 7/16 in. by 2 1/16 in. by 2 15/32 in., with a ¾ in. screwed conduit entry.

Another New Hairdryer

A NEW electric hair dryer is shortly to be marketed by MORPHY-RICHARDS, LTD., Cray Avenue, St. Mary Cray, Kent. Two models will be available, the finish being either in grey or ivory. For the former the list price is 49s. 6d. plus purchase tax, and for the ivory model 54s. 6d., plus tax. Both models utilise an induction-type motor, for the standard voltage range of 200/220 V or 225/250 V. a.c.

Modern styling characterises the M.R. hairdryer

Shaving in Style

A NEW STYLE electric razor, for which many claims are made by the manufacturers, REMINGTON RAND, LTD., Commonwealth House, 1-19 New Oxford Street, LondonW.C.1 is the new Remington "60." Its title originates from the claim that a perfect shave can be obtained with this model in sixty seconds.

The new style shaver

Features which contributed to the performance of the streamlined "60" include extra long, twin shaving heads with super-honed cutters, a more powerful motor, and 132 cutting blades. The switch, too, is conveniently placed; and a detachable plastic hair pocket permits faster cleaning.

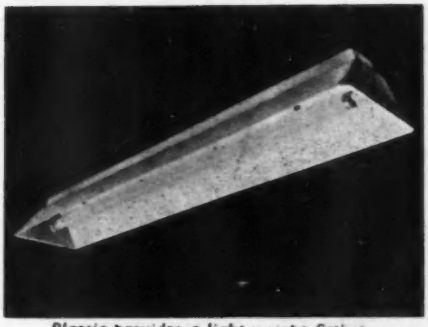
Two models are available in an attractive gift and display case. The "60" Regular, for 210-250 V a.c./d.c. is priced £9 19s., and the Dual Volt, for 110-150 V and 190-250 V a.c./d.c. at £10 19s. 1d., both including purchase tax.

Fluorescents in Plastic

AN all-plastic fluorescent lighting fitting, made from rigid p.v.c., has been introduced by NEW ERA INDUSTRIES (TOTTENHAM), LTD., 1A Stoneleigh Road, Tottenham, N.17.

Extremely light in weight, it is almost unbreakable, and in acid, corrosive or irritant atmospheres it is proof against deterioration, it is claimed.

The fitting has other special modifications in addition. The spine incorporating the control gear, together with the reflector, is produced as one jointless moulding. Patent coverage of this innovation has been secured. It is produced in two-colour laminate—grey on one side and white on the reflecting surface. Prices are as follows: 4 ft single 40 W trough, £7 18s.; 4 ft twin 40 W trough, £10 10s.; 5 ft single 80 W trough, £8 18s.; and 5 ft twin 80 W trough, £12 15s.



Plastic provides a light-weight fitting

An Improved Version

THE B.N.E. C51 electric cooker, introduced late last year, met the demand for a low-priced model that incorporated many of the most desirable features of more expensive cookers. The C51 has now been made even more attractive by modifications to the main front frame to bring it flush with the floor, and to include a drawer of ample dimensions for pots and pans.

Improvements make for better appearance in the C51

Basically, the cooker remains as before, retaining its oven size of 2,608 cu in., two to three-plate interchangeable facility, the two-tone ivory vitreous enamel finish and many other features.

With drawer and fuses, the standard two-plate model is now priced £29 4s., and the standard three-plate model, £32. Simmerstats and radiant plates, etc., can be supplied at extra cost. The manufacturers are BRITISH NATIONAL ELECTRICS, LTD., Charlton, London, S.E.7.

Swedish Soapstone Radiators

HANDLED in this country by BELL BROS AND CO. (LONDON) LTD., 37 Camomile Street, E.C.3, are a range of soapstone heat-storage radiators made by a Swedish firm under the name Handol.

Following generally the same principle as other models available in this country, the Handol heaters are somewhat smaller in dimensions, the smallest, No. 320, measures 11¼ in. long by 14¼ in. high and is 2 in. wide across the body. Approximate weight is 28 lb. There are six models available rated at 250 W, 500 W, 700 W, 1,000 W (two models), 1½ kW and 2 kW. All types have been approved by the Swedish authorities and bear the so-called "S" mark.

The Latest Valves

TWO additional valves recently introduced by MULLARD, LTD., Century House, Shaftesbury Avenue, London W.C.2, make possible the designing of a complete audio amplifier using valves with the Services' preferred B9A (Noval) base. The new valves are the EL84 high sensitivity output pentode and the EZ80 full-wave rectifier. The complete series now comprises the EF86 voltage amplifying pentode; three double triodes Types ECC81, ECC82 and ECC83; the EL84 output valve and the EZ80 rectifier.

The company has also introduced a range of

miniature battery valves, for which it is claimed the filament consumption is half that of previous comparable types. The range comprises the DK96 frequency changer, the DF96 I.F. amplifier, the DAF96 diode a.f. pentode, and the DL96 power output valve.

Multi-Way Switches

INTENDED primarily for the telecommunications and allied industries, Winkler multi-way switches are of robust construction and suitable for use in tropical conditions. They are available in single, double and three-pole designs, and with one to six banks operated from a common shaft.

Positive switching up to 25 ways per switch bank is achieved by the incorporation of a step-wheel mechanism, a spring-loaded pawl arresting the rotary motion at each contact. The latter are of Argodur 27 hard silver, plated, or Rhodium-coated contacts can be supplied if specified.

Overall resistance (contact to contact) is 5,000 megohms, and load per contact, 80 VA. They are supplied in this country by G. A. STANLEY PALMER, Maxwell House, Arundel Street, Strand, W.C.2.

TRADE PUBLICATIONS

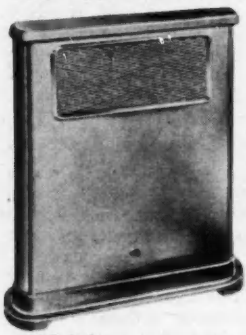
LIGHTING FITTINGS. A range of fittings for fluorescent lamps, both straight and circular, are featured in two new leaflets by Morley's Electrical Services Ltd., 117 Hornsey Road, London N.7.

FUSE SWITCHES. Single and repeater drop-out fuse switches for rural electrification schemes are illustrated in leaflet FSP2 issued by Line Equipment Ltd., 32 Queen Victoria Street, London E.C.4.

GENERATORS. A range of petrol and diesel engine driven generators and charging sets, for industrial and domestic use, is the subject of a leaflet circulated by Brodie and Askham Ltd., 330 Kennington Lane, London S.E.11.

New Season's Fires by M.E.M.

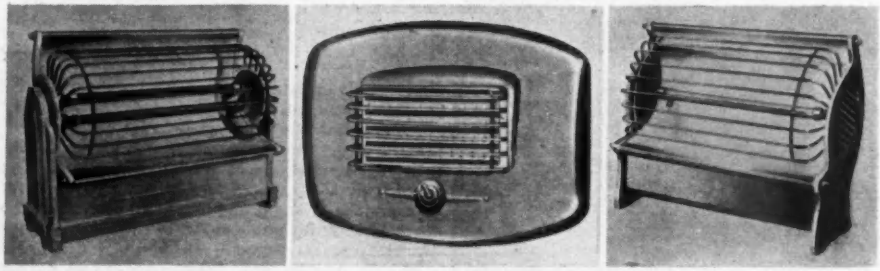
OUR accompanying illustrations show part of the range of electric fires which the Midland Electric Manufacturing Co., Ltd., of Tyseley, Birmingham 11, are putting on the market prior to the commencement of a new winter season. The new convector heater, of a simple but dignified design, and finished in bronze colour, will be available in the 200/220 and 230/250 voltage ranges. The 1 kW convector retails at 152s. (plus 83s. 7d. purchase tax), and, with a thermostat, at 180s. (plus 99s. p.t.). A 1½ kW model retails at 180s. (plus 99s. tax), with thermostat at 200s. (110s. tax).



M.E.M.'s new convector

Among the fires are the "Memray" swivel reflector models in 1 kW and 2 kW ratings, the latter arranged for full or half heat. These have been finished in cream and bronze. The 1 kW "Memray" is priced at 55s. (plus 30s. 3d. p.t.), and the 2 kW at 75s. (plus 41s. 3d. tax). Another type of reflector fire is the "Reflex," again in 1 kW and 2 kW sizes, and similarly the 2 kW model has been designed for full or half heat. This retails at 67s. (plus 36s. 10d. tax), and the 1 kW fire at 48s. (plus 26s. 5d. tax).

A sturdily built non-reflector type of fire is the "Mayfair." In this case the 1 kW model is priced at 40s. (plus 22s. tax), and the 2 kW model at 62s. (plus 34s. 1d. tax), and both are available in either cream or mottled stone finishes. Finally M.E.M. have their attractive design of panel fire, the 1 kW type retailing at 50s. (plus 27s. 6d. tax), and the 2 kW at 85s. (plus 46s. 9d. tax). These are available in mottled stone or mushroom finish and, like the others already mentioned, are suitable for 200/220, 220/230 and 240/250 voltage ranges. All models are fitted with safety guards, complying with British Standards Specifications.



M.E.M.'s fires, from left to right, the "Memray" swivel reflector, the panel (outset pattern) fire, and the "Reflex" reflector model

The WEEK in NEWS

THIRD ELECTRICAL EXHIBITION

Dates Fixed for Longer and Bigger Display

THE Association of Supervising Electrical Engineers has fixed the dates for next year's Electrical Engineers' Exhibition. It has been decided to extend the third exhibition to five days, and it will open on Tuesday, March 16, and continue until the Saturday, March 20. The venue will again be Earls Court, and hours of opening will be from 10 a.m. to 7 p.m. Thus from modest beginnings at the Horticultural Hall, Westminster, and even before that, from a small display organised by the Association's N.W. London branch in 1950, this exhibition has grown and continues to grow, to rank with the longer standing trade shows in size and importance. In a statement on Tuesday the A.S.E.E. said they had been guided by the consensus of opinions expressed by exhibitors, in making it a five-day event.

Features of last year's show were the Illumination Way and cooking displays; in 1954 the accent will be on switchgear. It is early days yet for details of the coming exhibition, but we can be quite sure that there will be many new faces, and that the number of exhibitors will once again far exceed that of 1953. We understand that the hiring of the whole of the ground floor at Earls Court is being contemplated in order to accommodate all those wishing to take space.

FURTHER £500,000 CAN NOW BE SPENT ON STREET LIGHTING

THE capital investment limit on street lighting projects has been raised by 25%, it was officially disclosed on Monday. This was forecast exclusively in the ELECTRICAL TIMES on July 16. Immediate result of this decision will be that approval will be given to many more street lighting schemes forwarded by local authorities for Ministry sanction. The investment limit for 1952-53 was fixed at £2 million and the additional 25% will apply to the current financial year.

There is little doubt that full advantage of this raising of the limit will be taken by local authorities, manufacturers of equipment and street lighting engineers. Although it does not mean that extra money is actually available for more schemes, many proposals have in the past been shelved, temporarily at least, merely because the limit to which local authorities can spend money on new street lights in any one year, had been reached. The value of the projects postponed must easily exceed the £½ m. mark, and thus manufacturers can be certain of a £500,000 increase in turnover during the remainder of this year and in succeeding years.

WATER HEATERS FREED FROM HIRE PURCHASE CONTROL

AS from tomorrow (Friday) all water heaters will be exempted from the provisions of the Hire Purchase (Control) Order, the Board of Trade announced on Tuesday. Hitherto it has been necessary, when buying either a gas or electric water heater to pay an initial deposit of 33⅓% and the remainder of the cost within 18 months.

This step has been taken following consideration of the Ridley Committee's report which stated that the use of gas and electricity required less coal than solid fuel appliances in providing occasional hot water supplies. The wider installation of these appliances is therefore expected to make for greater savings in the use of fuel.

No Load Spreading

LOAD spreading will not be necessary in S. Wales this winter, the Welsh Board for Industry stated last weekend. Industry was warned, however, that the margin between generation and consumption would be small and severe weather might necessitate emergency measures.

The First Half-Century

A set of draft regulations for controlling the manufacture of accumulators has just been issued by the Home Office. They will supersede the Rules of 1891, and are to come into force at the beginning of October. Anyone who objects to them has until September 19 wherein to state his case, and can demand a public enquiry. But such a contingency is not likely to arise, since the manufacturers have already been consulted, and the Home Secretary understands that the trade generally is satisfied that the regulations are reasonable. From the text it will be seen that stringent precautions are taken to protect the workers from lead-poisoning. Perhaps, however, some employee will denounce Rule 20 as an unwarrantable attack upon the liberty of the subject. It prescribes that "every person employed in the manipulation of dry compounds of lead or in pasting shall take a bath at least once a week."—*From our issue of August* 20, 1903.

Above is a scene during one of the demonstrations of domestic appliances arranged by the English Electric Co., Ltd., during the International Congress on Home Economics. As stated last week, the Congress took place in Edinburgh, between August 12 and 18. The demonstration pictured here took place in the S.E. Scotland Electricity Board's Showrooms. Over 1,200 delegates attended this eighth Congress and, incidentally, the E.A.W. was represented by three representatives headed by Dame Caroline Haslett

ANOTHER OVERSEAS CONTRACT FOR BRITISH COMPANY

A SECOND large overseas contract has been secured by Crompton Parkinson, Ltd. The company announced last week that the Crown Agents for the Colonies, acting on behalf of the Government of Malta, has asked them to supply underground cables and overhead lines valued at over £650,000 for the new electrical distribution system there. Consulting engineers are Messrs. Preece, Cardew and Rider. The new system will distribute power from the power station being built at Jesuit's Hill.

We understand that Crompton Parkinson will supply all material for h.v. and medium voltage conductor networks, as well as laying underground cables and erecting o.h. lines. Installation work will start in about two months' time and is expected to be spread over about four years.

£700,000 Aid for British Industry

BRITISH industry is to receive £700,000 for short term loans for the purpose of increasing productive efficiency, it was announced on Monday. The money is part of a revolving fund of £1 million set aside in the programme for the expenditure of counterpart funds from American economic aid under the Mutual Security Act of 1952. The balance of £300,000 is to be given to agriculture. An independent committee has been set up to advise the President of the Board of Trade on the administration of the industrial portion. The committee has already met and made recommendations as to the type of concern eligible for aid. These have been accepted. They are now ready to receive individual applications.

In general, any project which aims at raising productive efficiency will be eligible for consideration. It is understood that special consideration will be given to small firms.

OFFICIAL PUBLICATIONS

NATIONALISED INDUSTRIES. Report of Select Committee. (*See page* 326.) H.M.S.O. 4s.

CENSUS OF PRODUCTION. Vol. 3: Metal Manufacture and Vehicles. 1950 Rept. H.M.S.O. 2s.

BRITISH STANDARD
B.S. 1986: Dimensional Features of Measuring and Control Instruments and Panels for Industrial Processes.

INDUSTRIAL HEALTH RESEARCH BOARD. Report on Study of Telegraphist's Cramp. H.M.S.O. 3s.

HIRE PURCHASE (CONTROL) (Amendment No. 4) ORDER, 1953. S.I. 1264. (*See page* 351.) H.M.S.O. 2d.

A.S.E.E. ANNOUNCE AWARDS for INVENTIONS

THE Thurston Trophy and prize of £10 in the A.S.E.E.'s Inventions Competition for 1952-53, has been awarded to Mr. A. W. Pelerin of Kingsbury, London. The particular invention which won the award was a new design of Tandem Brush Holder, which, incidentally, was shown at the Electrical Exhibition last March, by Synthetic Carbon and Engineering Co., Ltd. It was referred to on page 532 of our March 19 issue.

This competition, open only to members of the Association, is intended to encourage the inventiveness of members and the development of ideas likely to benefit the electrical industry. For this purpose, Dr. A. P. Thurston donated a trophy and an annual cash prize of £10. Presentation of the awards, as in the case of the W. E. Highfield Shield Competition (see last week), will take place at the opening meeting of the London Lecture Session on October 20.

E.A.W. Examinations

RESULTS of three examinations staged by the Electrical Association for Women last May and June have been announced. The first in chronological order was the fourth examination for Electrical Sales Assistants. This took place at eight centres on May 19 and 19 candidates qualified for the certificate, nine of whom gained distinction. Total number of certificate holders is now 117.

The 33rd Electrical Housecraft Exam. for Demonstrators and Saleswomen was held on June 18. Eight candidates qualified in this case, three gaining distinction, bringing the total number of those holding certificates in this examination to 2,014. Finally, on June 20, the Association's 30th Electrical Housecraft Exam. for Teachers took place when 31 candidates were successful, three passing with distinction. As a result, 1,817 teachers now hold this certificate.

Concrete Street Columns Criticised

THE now familiar and increasingly popular concrete column for street lighting was the subject of criticism at a recent meeting of the S. Westmorland Council. Few disparaging remarks have been passed about these structures and it is therefore unusual to hear them called "concrete gibbets with corpse-like lamps hanging at the end." The objector maintained that the proposed erection of the columns in several villages would spoil the amenities, and that there were plenty of craftsmen who could make better fitted wooden poles. He also complained that the concrete columns erected in part of Windermere were out of place.

There was little support for these views, however. It was explained that existing telephone and electric power poles would be utilised in the planned schemes but concrete posts were also envisaged. Other points raised in favour of concrete were that cast iron poles were not available, wooden standards were more susceptible to decay, and would also cost about three times as much. A motion for reference back had only four supporters and was defeated.

Belfast Boiler Contract Dispute

THE application to restrain the Belfast Corporation from accepting without public advertisement the tender of Babcock and Wilcox for boiler plant for the new West power station was adjourned until August 25 at the hearing in the Ulster High Court last week. This is to enable the prosecutor to serve notice on the Corporation and give them time to file replying affidavits. An assurance was given that the Corporation would not seal the contract in the meantime. The proceedings are being brought by a member of the Corporation, Alderman C. M'Kee, and others.

Kitchen Clean-up

RETURNING from their summer holiday, many housewives will want to give their kitchens a newer, fresher look. So the Electrical Development Association—not to be found wanting—has seized the opportunity to produce a neat booklet on kitchen planning with adequate good advice of the service that electricity renders to the housewife.

Features on cookers, water heaters, washing machines, refrigerators and lighting are included, so worded that they talk to the housewife and not to the engineer.

There are 16 pages of useful information, supplemented by photographs, some in colour, which do credit to a timely publication.

Congo Power for Rhodesian Copper

THE proposed contract for the sale of bulk supplies of electricity by the Belgian Congo for use in the N. Rhodesian copper mines has been approved by the Belgian Colonial Council, we heard last week. Supplies are not expected to begin until 1957 when the new Union Miniere du Haut Katauge power station is completed. By that time the station should be yielding a surplus for export which will assist the Rhodesian mines until various hydro-schemes there begin to be effective. Generating capacity of the Union Miniere in 1957 is expected to be 2,250m. kilowatt hours, p.a.

Work Simplification

A POPULAR belief is that the improvement of Britain's ability to increase exports will depend on her capacity to make more intelligent use of machinery and manpower. With this in mind the British Association for Commercial and Industrial Education arranged a course on Work Simplification, earlier this year. That course, at the Roffey Park Training Centre near Horsham, Sussex, is to be repeated between October 26 and 30.

"Before-and-After" photographs always have a strange fascination. The two reproduced here show a Langley Park (Durham) grocer's shop where tungsten filament lamps have been replaced by tungsten ballast B.T.H. fluorescent lamp fittings and suspended from the original lighting outlets

Part of the S.E. Scotland Electricity Board's display at Agricultural Shows this summer. Particular attention was paid to latest developments in equipment for the dairy, barn, crop treatment, pumping, poultry and grain drying. At the Berwickshire Agricultural Association's annual show, the Board's exhibit was awarded first prize for the best exhibit in the trade display section. In addition to the Royal Highland Show the Board have had a stand at eight major shows this year

Introducing England to Colonial Students

COLONIAL students arriving in this country for various studies are very often faced with a mode of life almost unintelligible after their previous way of living, and as the numbers of these students are now considerable, a reminder of the introductory courses arranged for them by the British Council may not be amiss. The Council has this year nearly doubled the number of places available and we understand applications have been received from students due to arrive from such countries as Fiji, Gold Coast, Hong Kong, Malta, Sarawak, West Indies and many others. The residential courses, being held at King's College Hall, London, between August 10 and September 28, consist of talks and discussions on such subjects as accommodation, use of gas and electrical appliances, police services and health, and are aimed at fitting students for their future stay in England. Students who are unable to secure places on the courses may attend two-day non-residential courses.

A Lincolnshire Village Expands

SINCE work on the new power station at Keadby (Lincs) began, the neighbouring villages of Althorpe and Keadby have grown out of all proportion to the parishes of about three years ago. In addition to the power station, a new dock has been built by one of the big petroleum companies. Trade has increased considerably and the population grown to the extent that 300 houses have been built in the last two years and more are going up to house the numerous workers on various projects, a large number of whom gather at the power station for social functions. Thus it has been suggested that the two parishes should amalgamate. Now, Lindsey County Council has accepted the proposal and a public enquiry is to be held soon to consider the matter. At the same time approval has been given to the replacement of the old swing bridge over the S. Yorkshire canal by a new £40,000 bridge capable of taking heavy traffic and making a route out of Keadby to the north.

The existing bridge is in any case reaching the end of its useful life.

N.C.B. Developments

A SITE at Bretby, in Derbyshire, is being considered for the National Coal Board's new Central Engineering Establishment. As mentioned in the Board's report for 1952, the Establishment will be concerned with the development of new machinery and equipment and the testing of machines, ropes and new materials.

We heard last week also that a new electrical signalling device has been developed for stopping conveyors and haulages. The system allows for any number of signals to be given but brings machinery to a standstill when one long signal is sent out.

Welsh Industries Fair at Cardiff

HELD annually each year since 1934, the Welsh Industries Fair will open at the new Pavilion in Sophia Gardens, Cardiff, on September 9 The official inauguration ceremony will be performed by Mr. A. G. B. Owen, and the exhibition will then continue until September 19. The Fair is organised by the National Industrial Development Council of Wales and Monmouthshire, and has become an increasingly important event since the war, during which time many new factories and manufacturing bodies have sprung up in Wales. At the Fair heavy basic industries will be well represented, while by no means least among exhibits will be displays of heavy and light electrical equipment and numerous electrical appliances.

Trade Mission to Iraq

FOLLOWING the trade economic and financial talks between representatives of this country and Iraq which have just ended in London, the Government has decided to send a trade mission to that country this autumn. The party will include officials of the Board of Trade and representatives of the Federation of British Industries. Among the long-term development schemes for Iraq are those concerned with transport, roads and irrigation projects.

NEWS IN BRIEF

Yorkshire Electricity Board is to build offices and showrooms in Park Avenue, Penistone, within the next two years.

S.W. Scotland Electricity Board is organising its second cookery competition for boys and girls between 12 and 15 years of age. Last year's contest, the first, attracted some 500 entrants of both sexes and its huge success made a repeat this year a necessity.

Further presentation of long service and retirement awards to seven employees took place recently at the Trafford Park works of Lancashire Dynamo and Crypto Ltd.

The specialised exhibitions at the 6th Liege International Fair, which is to be held from April 24 to May 9, 1954, will include an exhibition of material for the thermic treatment of metals.

Model Engineer Exhibition is now being held at the New Horticultural Hall, Westminster. It closes on August 29.

A conference was held at Broadcasting House, London, recently to discuss technical aspects of television programme exchanges in Western Europe.

Members of the West Wales (Swansea) sub-centre of the I.E.E. recently visited the Gloucester and Cheltenham works of Permali, Ltd., for their annual outing.

Members of E.A.W. are arranging visits to the Engineering, Marine and Welding Exhibition.

Praise for Board's Salesmen

SOME of the achievements of the S. Western Electricity Board were given by Lady Carew Pole last week at a local presentation of E.D.A.'s public speaking award to a sales representative on the Board's staff at St. Austell. Lady Pole, who is chairman of the Consultative Council, said she was pleased to note that the prize had been won by a sales representative, who had a vital part to play now that further promotional activities were allowed. She said that nearly 300 consumers had been connected every month in the past five years in Cornwall's rural areas, which necessitated an annual expenditure of £500,000. Nearly 100,000 consumers now had a supply in Cornwall, Lady Pole continued, and a large part of this development had been made possible by the Board's sales representatives. With increased sales of apparatus, electricity consumption had risen from 500 units per domestic consumer in 1939 to 1,700 units at present. Similar increases could be detailed for other types of consumers.

Final Accounts of Iron and Steel Corpn.

THE Iron and Steel Corpn. of Gt. Britain has published its final statement of Accounts for the period October 1, 1952, to July 12 this year. This was the final function of the Corporation under the Iron and Steel Act, 1949. The previous report and accounts covered the year ending September, 1952, and recorded achievements in production and profits, but this latest deals only with the Corporation's finances. Copies of the accounts may be obtained from the Iron and Steel Holding and Realisation Agency at 1 Chester St., S.W.1, price 5s.

JUST PART OF ELECTRICITY'S SERVICE

A STORY was told to us last week of the Bank Holiday show and fete held at Walsall. The Midlands Electricity Board were well to the fore with an attractive exhibit, but soon discovered that they were involved in the unusual task of drying out venturesome children who inadvertently, or otherwise, fell into the waters of the lido nearby. It all started apparently when the show committee sent along one child and the Board, always willing to oblige, undressed him, put his clothes through the wringer, dried and ironed them and sent him home. But that child was followed by another, and another, and another, until the youthful customers filled the hut at the rear of the stall, and even a lamp for warming piglets was pressed into service as an emergency dryer. No doubt, the Board's salesmen are now busy persuading lido authorities to install a permanent clothes dryer in the vicinity.

Annual Meeting

A GENERAL meeting of the Electrical Trades' Commercial Travellers' Association will take place at the Feathers Hotel, Broadway, Westminster, at 6.30 p.m. on September 11.

This must surely be one of the most impressive examples of floodlighting we have published for a long time. It shows the ruins of Ludlow Castle in Shropshire where Benjamin Electric Ltd. planned the scheme using Duoflex and Specular floodlights. Complete installation was carried out by the Midlands Electricity Board

Electric Supply News . . .

Altrincham

The new Broadheath 132 kV sub-station was put into service last week, and as a result, Altrincham and North Cheshire became connected to the 132 kV grid system. Until last week the area was supplied through a 33 kV Cheshire ring from Stockport generating station. The sub-station is now linked directly with Carrington, and will be connected with the new 275 kV grid system when it is completed. The new station stands on a 2,000-year-old Roman road. A full description is given on page 339 of this issue.

Belfast

The acting city electrical engineer and general manager, Mr. R. P. Watson, has reported to the Corporation Electricity Committee that examination has disclosed no evidence of sabotage at the Harbour power station, following the breakdown during the visit of Queen Elizabeth and the Duke of Edinburgh to Belfast on July 2. The manufacturers, Mr. Watson said, had described the occurrence of the failure when it did, as "a remarkable coincidence." The breakdown could most probably be attributed to an insulation failure of the 33 kV busbar supports, the report stated. Extensive examination and tests which had been made did not reveal any weakness in the insulation security of the remaining busbars.

Elland

The new generating station being planned for Elland, is to have three 60 MW sets installed instead of one as originally programmed, according to an official of the Yorkshire Division of the B.E.A. Cooling water will be taken from the River Calder and there will be two concrete cooling towers, it is stated. But at the moment the plans are still awaiting the consent of the Ministry of Fuel and Power. When the scheme for the construction of the new station was first put forward in April 1951, it was stated that the 40-acre site required would include part of the Elland Urban District Council's sewage beds at Lowfields. The B.E.A. agreed to replace the beds with new ones, and the final negotiations on this are to be made shortly in London between representatives of the Council, the B.E.A. and various Government departments. It has been said that work on the foundations may begin early next year, but obviously this assumes quick Ministerial approval.

Fifeshire

A report on progress on the proposal to install plant for generating electricity at the new dam at Glenderon Reservoir, was given at the monthly meeting of Fife County Council recently, by Mr. D. Fraser, convener of the Water Supplies and Drainage Committee. He stressed that the stage had been reached in the construction of the dam where some action would have to be taken with regard to the proposal to develop an electricity scheme. An earlier disagreement between their own engineer and the constructing engineer had been settled, and the contractors had given an assurance that in the event of the scheme being proceeded with, there was no reason why there should be any slowing up of the work. The question of the financial participation by the North of Scotland Hydro-Electric Board remained, however. It was agreed to invite the Board to indicate their attitude in this matter. We earlier referred to this proposal in our July 24, 1952 issue. At that time it was estimated that 1½ million units could be generated annually, which it was suggested the Board would purchase at ¼d. per unit.

Great Yarmouth

The Minister of Fuel and Power has given his consent to the building of the new power station at South Denes, Great Yarmouth. Announcing this on Monday, the B.E.A. states that the new station will have an installed capacity of 240,000 kW. This will comprise four 60,000 kW turbo-generators each served by a boiler unit having a evaporative capacity of 550,000 lb. of steam per hr.

Lewis

Protests that the isolated areas of Lewis were being victimised by the North of Scotland Hydro-Electric Board were made in the Lewis District Council recently when Mr. Price, area manager of the Board, met the members to explain that the Board's policy of free servicing would not apply to the villages of Arivruaich and Aline, although the Board were prepared to give the six potential consumers in Aline and the 25 in Arivruaich a supply on a line-rental basis. The charge—£1 per room annually for seven years—would have been higher if the mains supplying Tarbert did not happen to pass through the two villages. Although most Lewis consumers receive electricity without a line-rental, Mr. Price said that Lewis was not a paying area. In Lewis, electricity is diesel generated. The council decided to ask the Board to supply these two villages on the same basis as the Lewis villages already supplied.

LIGHTING SCHEMES

Buxton.—The Council is proposing to convert street lighting from gas to electricity.

Margate.—T.C. seeking consent to borrow £1,150 for improved lighting at Linksfield Road, Westgate, and replacement of gas installation at Nayland Promenade destroyed in February's gale.

Ormskirk.—The borough surveyor is to prepare a scheme for improved lighting from Stanley Street to the junction of Greetby Hill with Tower Hill.

Petersham.—Street lighting on the new housing estate at Sandy Lane is expected to cost £1,020.

Company Activities . . .

British Columbia Electric Railway

Operations during 1952 resulted in a consolidated gross revenue of $47,041,786 which is an increase of over 10% on the 1951 figure. After charging operating expenses, depreciation etc., the operating income amounts to $4,703,412 compared with $3,434,849 for the previous year.

Brush Electrical Engineering Co.

It is proposed to raise approximately £914,000 net by an issue of 940,000 6% £1 Cumulative Convertible Redeemable Preference shares at par. An extra-Ordinary meeting to consider the proposal will be held on September 3. These new Preference shares will rank after the existing £1,660,000 5½% issue. Holders will have the option to convert on any June 30 or December 31 up to the end of 1963 into Ordinary stock at the rate of four 5/- Ordinary for every £1 Preference, plus a conversion premium in cash of 1/- for each 5/- Ordinary taken up. On the expiration of the conversion option the shares will be redeemable at 21/- with an ultimate redemption date at the end of 2003.

This new issue will, in effect, raise the Board's borrowing power by a further £1,880,000, but it is stated that there is no present intention to seek additional facilities to that extent. The Board considers that with the additional facilities which the bankers have agreed to make available and the proceeds of the issue, the company will have adequate funds for current requirements. In the opinion of the Board, if conditions in world markets do not deteriorate further, earnings should cover the £211,000 needed for the 5½% and 6% Preference dividends with relative profits tax and leave a margin of profit.

Britannia Electric Lamp Works

The group net profit for the year ended March 31 last, at £24,374, is over £14,000 lower than for the previous year, according to the preliminary statement. This is only partly due to increased taxation. But the dividend is again 12½%.

Electrical Switchgear and Associated Manufacturers Ltd.

A record trading profit resulted from operations during the year ended March 31 last. The figure is £391,000 compared with £324,000 for the previous year. But taxation takes much more this time, chiefly because of £51,400 for Excess Profits Tax. As a result, the group net profit after depreciation and other charges, amounts to £84,374 as against £106,771 for the preceding year. In the group current assets, stocks and work in progress is listed at £765,263 (*£663,070*).

London Electric and General Trust

With an increase in revenue for the year to June 30 last, it is proposed to raise the dividend. There is to be a final Ordinary dividend of 9½%, which, with the interim, makes a total of 12½%. For the previous year the total distribution was 8%. Revenue for the year just ended amounted to £38,728—nearly £4,000 more than in the previous year—and this after providing for expenses, debenture interest and taxation.

Nigerian Electricity Supply Corpn. Ltd.

It is heartening to see that the revenue from power sales still further increased during the year ended February 28 last, as shown in our accompanying table. This was partly due to the increase in charges allowed and to another rise in consumption of electricity. The balance sheet shows that stores in hand and in transit have been reduced in value to £55,295 compared with £86,688 a year ago.

Year to Feb. 28	£ Power Sales	£ Net Profit	% on Ord.		Ord. Price	
			Earn'd	Paid	High	Low
1949	205,513	55,554	18	10	36/9	30/-
1950	214,122	60,788	20	10	33/3	28/3
1951	207,923	53,386	19	10	32/3	27/6
1952	231,959	52,064	16	10	28/1	20/-
1953	274,782	67,076	20	10	23/-	21/6

Ruston and Hornsby Ltd.

In his review of operations during the year ended March 31 last, Mr. W. J. Ruston, chairman, refers to the acute position of material supplies in the early months of the year, particularly affecting such components as crankshafts. Although the situation has eased considerably, he feels that the company is still carrying stocks at too high a level, and the problem of their liquidation is not easy. The order book is at almost the same level as a year ago, but it has been necessary to reduce production in several directions due entirely to market difficulties. Many overseas markets, formerly very promising, are now almost closed, but every effort is being made to explore and develop other markets. In Canada large premises will be built to store engines and spares in order that full and immediate service can be given. The latest standard models of 750 kW and 1,000 kW gas turbines have had an extremely good reception in both home and overseas markets, he adds, and several orders have been received, some of which have been executed. A new shop for batch production of gas turbines has now been fitted out with up-to-date equipment and tools.

Dividends Declared

Cape Electric Tramways (1949).—Dividend of 5½% (*same*).

Engineering Components.—Interim of 5% (*same*).

Commercial Information

CONTRACTS OPEN

HOME

Aug. 21.—Lancashire. Electrical installations in police houses in North, West and East Lancs. Applications, specifying area, to County Architect, County Hall, Preston, by above date.

Aug. 21.—Sheffield T.C. Supply of electrical machines required for College of Technology. Documents from S. Moffett, director of education, Education Office, Sheffield.

Aug. 22.—Hawick T.C. Electrical installations in erection of 23 houses at Burnfoot. J. A. W. Grant, chart. archs., 36 Melvill St., Edinburgh.

Aug. 22.—Sedgley U.D.C. Supply of units to convert 36 existing gas columns to electricity with 80 W mercury vapour lighting, including all necessary gear, and erect the columns on four roads. W. M. Jones, engineer and surveyor, The Limes, Dudley Rd., Sedgley.

Aug. 22.—South Liverpool Hospital Management Committee. Electric light and power wiring, and installation of Pillotone points in Ward 20 at Sefton General Hospital. G. Chaplin, secretary to the committee, Sefton General Hospital, Liverpool 15.

Aug. 24. — Cheltenham T.C. Supply and erection of sodium street lighting equipment in Group A—including lanterns, lighting equipment, steel columns—for Bath-Lincoln trunk road. C. Gould Marsland, Borough Engineer, Municipal Offices. Deposit £3 3s. (See July 16 issue.)

Aug. 24.—Esher U.D.C. Installation of electrical wiring and fittings at sewage works. Engineer and Surveyor, Council Offices. Deposit £1 1s.

Aug. 24.—Keighley T.C. Supply of beacons with flashing control equipment for nine zebra crossings. Borough Engineer, College Street.

Aug. 24. — Manchester T.C. Supply of 62 trolley bus chassis complete with all electrical equipment. General Manager, Corporation Transport Dept., 55 Piccadilly, Manchester.

Aug. 24.—Manchester T.C. Renewal of electrical installation in three houses on Langho Colony, nr. Blackburn. City Architect, Town Hall. Deposit £1 1s. (See Aug. 6 issue.)

Aug. 24.—Southgate B.C. (*a*) Supply only of lanterns and control gear for 115 140 W sodium vapour discharge lamps; (*b*) supply and erection of 115 concrete lamp columns, lanterns, wiring, control gear, etc. Borough Engineer and Surveyor, Town Hall, Palmers Green, N.13. (See July 23 issue.)

Aug. 24.—Stretford T.C. Electrical installation in 121 flats and houses on Talbot Rd., Moss Park and Avondale Rd. sites. Documents from A. H. Perry, Borough Surveyor, Town Hall. Deposit £2 2s.

Aug. 24.—Sutton and Cheam U.D.C. Erection of 112 25-ft reinforced concrete columns with provision and fitting of G.E.C. lanterns and auxiliary equipment for 140 W sodium lighting on about 2·45 miles of road. N. H. Mitchell, borough engineer and surveyor, Municipal Offices, High St., Sutton, Surrey. Deposit £1 1s.

Aug. 25.—Rowley Regis T.C. Electrical installation in 166 houses on Tiridale Hall estate. Names to Borough Engineer and Surveyor, Municipal Buildings, Old Hill, Staffs., by above date.

Aug. 26.—Baildon U.D.C. Supply, erection, etc., of 42 250 W MV lanterns on concrete columns in Baildon Rd. and Browgate. Surveyor, Town Hall.

Aug. 26.—Hull T.C. Electrical installation in extension to Central Telephone Exchange, Mytongate. City Architect's Dept., Guildhall. Deposit £1 1s.

Aug. 28.—Belfast. Supply, erection, etc., of 33/6.6 kV, 10,000 kVA, outdoor step-down transformer, with tap-change equipment. (Tender No. 1299). Merz and McLellan, consulting engineers, Carliol House, Newcastle-on-Tyne. Deposit £5 5s. (See July 16 issue.)

Aug. 28.—Belfast T.C. Supply and erection of electric hoist-blocks for Municipal Electric Power Station East. Documents from Electricity Dept., East Bridge St., Belfast. Deposit £1 1s. (See Aug. 6 issue.)

Aug. 28.—Cardiff R.D.C. Supply, erection and wiring of 60 concrete street lighting columns and lamps on various housing estates. Engineer and Surveyor, S. P. Youldon, 20 Park Place, Cardiff. Deposit £3 3s.

Aug. 28.—Kincardine. Electrical wiring in total of 24 council houses on various sites. County Architect and Planning Officer, 34 Market Sq., Stonehaven.

Aug. 28.—Swansea T.C. Supply of refrigeration plant motor driven on 50 c/s a.c. supply 240 V for Technical College. L. J. Drew, Director of Education, Education Dept., Guildhall. (Advertised in this issue.)

Aug. 29.—Basingstoke (Hants). Supply of electric lamps during six months beginning Oct. 1 for Park Prewett Group Hospital Management Committee No. 47. Secretary is Fredk. Hales.

Aug. 29. — Cowdenbeath T.C. Improved lighting scheme on trunk road A90 between the burgh boundary at Perth Road and the boundary at Broad St. Burgh Surveyor, Town House, Cowdenbeath.

Aug. 29.—Worsley U.D.C. Supply and erection of about 82 sodium discharge lamps on concrete and existing traction columns along 1¼ miles of Memorial and Walkden Roads and Worsley Brow. Engineer and Surveyor, Town Hall, Walkden, near Manchester. Deposit £2 2s.

Aug. 31.—Barrow-in-Furness T.C. Supply and erection of screening plant comprising mechanical raking screen, fixed coarse screen, disintegrator pump and all motors, electrical gear, etc. Borough Engineer and Surveyor, J. N. Flitcroft, Town Hall.

Aug. 31.—Birtley (Dur.) R.D.C. Tenders invited for maintenance of about 540 street lighting units. Stanley Hunt, clerk to council, Council Offices.

Aug. 31.—Salford T.C. Electrical installation at Blackfriars public baths. General Superintendent, Admin. Offices, Blackfriars Public Baths. Deposit £1 1s. (See July 23 issue.)

Aug. 31.—Southgate B.C. Supply and erection at refuse disposal works, Barrowell Green, N.21, of an over-band type magnetic separator for use in conjunction with existing drum-type magnetic separator. Tender to include wiring and switchgear. Borough Engineer and Surveyor, Southgate Town Hall, Palmers Green, N.13.

Aug. 31. — Thurrock U.D.C. Manufacture and installation of 3 axial-flow pumps, electrically driven and complete with switchgear, starters, travelling overhead crane, etc., for Marsh Farm Sewage works. W. H. Radford and Son, consulting engineers. Albion Chambers, King St., Nottingham.

Sept. 1.—Buckhavon and Methil (Fife) T.C. Lighting installation in 32 houses being built on Savoy site. E. L. Forsyth, architect, Methil Brae, Methil.

Sept. 1.—King's Lynn T.C. Supply of steel columns, lanterns and control gear for street lighting scheme. Borough Engineer, H. G. Ridler, Clifton House, 17 Queen St.

Sept. 1.—Liverpool T.C. Installation of automatic telephone and fire alarm system at Cottage Homes, Fazakerley. City Engineer and Surveyor, Municipal Buildings (See Aug. 6 issue.).

Sept. 2. — Newcastle - on - Tyne T.C. Electrical and heating installations in erection of 1,284 flats on Longbenton estate. City Architect, 18 Cloth Market.

Sept. 7.—Cannock U.D.C. Supply, erection and installation of 66 140 W sodium and seven 3 x 80 W fluorescent lighting columns on Cannock Road, Blackfords-Cannock Road, Hednesford, B.5013. E. Lomax, Engineer and Surveyor, Council House, Cannock, Staffs. Deposit £2 2s.

Sept. 7.—Long Eaton U.D.C. Supply only of 30 sodium and 21 fluorescent lamps and equipment; and supply and erection of 43 concrete and four steel columns and fixing of lighting equipment for Class A street lighting along Nottingham Rd. and Market Place. Engineer and Surveyor, Town Hall.

Sept. 7.—Manchester T.C. Rewiring for electrical installation at "Ashton House," Corporation St., City Architect, Town Hall. Deposit £1 1s. (Advertised in this issue.)

Sept. 7.—Preston T.C. Total rewiring of the lighting, heating and power circuits at the main Corporation Storeyard, Argyll Road. Total capacity of installation will be approximately 250 kW. Borough Engineer and Surveyor, Municipal Building, Preston. Deposit £2 2s. (See Aug. 6 issue.)

Sept. 8.—Louth T.C. Supply and erection of two electrically operated booster pumps and three electrically operated borehole pumps with auxiliary equipment. J. H. Haiste and Partners, 4 Queen Sq., Woodhouse Lane, Leeds 2. Deposit £2 2s.

Sept.10. —N. Ireland. Installation of electrical services in buildings at Downshire Hospital Downpatrick. Hospital Authority's Chief Engineer, 104 University St., Belfast. Deposit £3 3s.

Oct. 17.—Tyrone. Electrical installation in new buildings on Goolnafranky estate, Cookstown, at a grammar school, secondary intermediate schol and dining-room. Chief Education Officer, Education Offices, Omagh. Deposit £3 3s.

No date stated.—Dumfriesshire. Electrical installation in erection of block of 8 houses and a shop in village of Ae, for Forestry Commission. John A. W. Grant, architect, 36 Melville St., Edinburgh.

OVERSEAS

*Details of items marked * may be obtained on application to the Board of Trade, Lacon House, Theobalds Road, W.C.1, quoting reference.*

Sept. 9.—South Africa. Supply of 110 lighting fittings to various specifications for S. African Railways. Chief Stores Superintendent, P.O. Box 8617, Johannesburg. B.o.T. (Ref: ESB 1052/53)*

Sept. 19.—Tangier. High and low tension cable, pylons, insulators, etc., to service eight 5,500 V transformer stations required by Electricity and Water Board, 4 rue Vermeer, Tangier. B.o.T. (Ref.: ESB 565/53)*.

Oct. 13.—New Zealand. State Hydro-Electric Dept., Wellington, invites tenders for supply of two 3-phase, 220 kV 2,500 MVA circuit-breakers and accessories for Otahuhu and Haywards substations. (Contract No.240) B.o.T. (Ref: E.S.B. 1198/53)*

Oct. 15.—Morocco. Supply of ten 100 kVA and ten 150 kVA 3-phase transformers for input of 5,500 V and output of 200/115 V, double star wound. Tangier Water and Electricity Board, 4 rue Vermeer, Tangier. B.o.T. (Ref. E.S.B. 379/53)*.

Your Queries — Answered

Stand mounted on castors for making a washing machine mobile, makers of? M.M.—Chardcraft Products, 124 St. Margarets Rd., Twickenham. (23569)

"Epok" fuse carriers, makers of? T.B.—G. P. Dennis, Ltd., Fleming Rd., Speke, Liverpool 19. (23580)

"Duo-Ray" infra-red apparatus, makers of? L.B.—F. W. Read and Sons, 175-177, Grays Inn Rd., W.C.1. (23587)

"Polly" tea maker, makers of? E.E.—Pye, Ltd., Cambridge. (23596)

"Fortafix" cement for joining glass to metal, makers of? L.C.—Fortafix Liquid Cement Co., London Rd., Bexhill-on-Sea. (23609)

"Excel" cookers, address for spares? E.C.—Selex Electric Co., Ltd., Yardley Rd., Kirby Trading Estate, nr. Liverpool. (23615)

"Speed King" hairdryers, address for service? A.W.—Wahl (England), Ltd., 215 Putney Bridge Rd., S.W.15. (23624)

"Roblec" irons, makers of? S.E.—Robson Electrical Products, Ltd., Union St., West Bromwich, Staffs. (23639)

The above are selected from questions we have answered this week. If you have a query, send it to us.

ANSWER WANTED

"Petwill" fluorescent lampholders and starter switches, makers of? N.D. (23645)

Oct. 27.—New Zealand. State Hydro-Electric Dept., Section 450, Hamilton District, invites tenders (Contract No. 237) for supply of two 11 kV current limiting reactors for Kaweran sub-station. Documents available at N.Z. Govt. Offices in London.

Nov. 3. — Brazil. Supply of various mechanical and electrical apparatus, including transformer equipment for Jacui Hydro-Electric power station at Potreirinho do Salto. Commissao Estadual de Energia Electrica. B.o.T. (Ref.: ESB 205/53)*.

Dec. 1.—New Zealand. Supply of 466 steel transmission towers for Tuai-Gisborne 110 kV line required by State Hydro-Electric Dept., Wellington. Deposit required is £100 and bond £4,500. Copies of specifications available at N.Z. Govt. offices in London.

CONTRACTS PLACED

Birkenhead T.C. Electrical work in erection of Preston primary school, J. H. Evans, £3,861.

Chatham T.C. Provision of lamps, and fittings for street lighting in Maidstone Rd, S.E. Electricity Board, £2,016.

Coventry T.C. Supply of equipment for street lighting on new estates: 350 class B columns, Revo Electric Co., £3,146; 450 MV discharge lamps, etc. British Thomson-Houston Co., £1,588; and 450 time switches, Venner Ltd., £1,496. For improved lighting in certain roads in the city: supply and erection of 290 class "A" columns, Revo Electric Co., £6,452; and lanterns £3,667; 290 MV discharge lamps, etc., British Thomson-Houston Co., £2,106, and 290 time switches, Venner Ltd., £964.

Derby T.C. Electrical work in 110 houses on Mackworth estate, H. I. Petts, £2,300.

Heston and Isleworth T.C. Installation of improved lighting in part of Staines Rd., North Midland Engineering Co. Ltd., £4,607.

Holborn B.C. Supply of flashing beacon equipment, Gowshall Ltd., £1,331.

Ilford T.C. Street lighting in part of Eastern Ave., Midland Engineering Co. Ltd., £7,991.

Lewisham B.C. Electrical work at various housing schemes, London Electricity Board, £6,858.

Ormskirk U.D.C. Street lighting along trunk road A.59, Revo Electric Co., £8,062.

PRICE OF CABLE METALS AND OTHER MATERIALS
(at Tuesday night)

	£ s. d.	New York price
COPPER, electrolytic	230-235	—
" (3 months)	215-216½	—
LEAD, good soft pig (foreign)... ...	95½-96½	112 0 0
TIN (99·99·76%) (Cash)	617½-620	—
" (3 months)	613½-615	—
ALUMINIUM, commercial purity (del.)	150 0 0	—
ZINC	73-73½	86-92
ARMOURING:		
Galv. Steel Wire (0·104 in.) ...	50 10 0	—
Mild Steel Tape (0·04 in.)... ...	40 0 0	—

GAZETTE ANNOUNCEMENTS

COMPANIES ACTS

Howard (Sunbury) Ltd., Weybridge. A. W. Hunter, 418-42 Strand, W.C.2. liquidator, released as from July 13.

Davis, Myer and Co. Ltd. Last day for receiving proofs in respect of intended dividends, Aug. 25. Liquidator is Bernard Phillips, 76 New Cavendish St., W.1.

Howard Motors (Nottingham) Ltd. Thomas B. Quail of 1 Oxford St., Nottingham, has been appointed liquidator.

P. A. Robinson (Electrical) Co. Ltd. General meeting and meeting of creditors will take place at 25 Bedford Row, W.C.1

TRADE NOTES

Change of Address. The London address of Heyes and Co., Ltd. is now, 11 John St., W.C.1. Telephone: Holborn 4183.

New Sales Depot. To meet increasing demand from Lancashire electrical dealers for their products, Siemens Electric Lamps and Supplies Ltd., are opening a new sales depot at Preston, on September 1, at Fylde Rd. (Telephone: Preston 86701). The new depot will be a subsidiary of the Manchester branch, and under the control of Mr. A. J. Barry, the Manchester manager. The Preston depot will operate a van delivery service.

New Depot. English Electric Co. Ltd., have opened new appliance and television dept. for maintenance and servicing in Clyde St., Glasgow. Telephone: Central 6910.

Sales Office. As from Monday next address of Northern Aluminium Co. Ltd.'s Newcastle-on-Tyne area sales office will be Groat House, Collingwood St. Telephone: Newcastle 20878/9.

BANKRUPTCY ACTS

Appointment of Trustee

Brighton. James W. Luker and Henry A. R. Phillips, electrical contractors, trading at East St., and at 206 High St., Lewes, as Gordon and Luker. Trustee is John S. Bradley-Hole, Cert.Acc., 7 Old Steine, Brighton.

Intended Dividends

Windsor. Kenneth J. Ward, electrical contractor trading at "Howard" Trusthorpe Rd., Sutton-on-Sea, Lincs. Last day for receiving proofs, Aug. 25. Trustee is C. T. Newman, Official Receiver, 58-61 York Terrace, Regent's Park, N.W.1.

Order on Application for Discharge

Torquay. Stanley A. Cooper, electrical engineer of 17 St. Margaret's Rd., Marychurch, Torquay. Order refusing discharge made on April 14.

Dividends

Brentford. Lionel J. Quick, electrical distributor trading at 2 The Mall, Ealing, W.5. First dividend of 3s. 6d. in £ payable on Aug. 25 at 25 Bedford Row, W.C.1.

Edmonton. Gordon F. Jenkins, electrician of 24 Browning Rd., Enfield, Middx. First and final dividend of 1d. in £ payable on Aug. 25 at Official Receiver's Office, 58-61 York Terrace, Regent's Park, N.W.1.

BUSINESS PROSPECTS

HOME

Aldridge (Staffs) U.D.C. List of contractors is being prepared of those wishing to be notified when tenders for property repairs and other minor works are to be let out. Electricians are included. Applications should be addressed to Engineer and Surveyor, Daw End, Rushall, Walsall.

Bishop Auckland U.D.C. Construction of 26 houses, 4 shops and 2 flats on Woodhouse Close estate. Engineer and Surveyor, 50 North Bondgate.

Camberwell B.C. Development of Picton St. site will involve four 11-storey, fifteen 4-storey, and four 3-storey blocks of flats and maisonettes, one block with shops. A total of 582 maisonettes, 73 flats and 26 houses are envisaged at a total cost of £1,686,430.

Carlisle. Building licence at £22,000 being sought for new R.C. church and hall at Harraby. Architect is W. C. Mangan, 2 Ribblesdale Place, Preston.

Chigwell U.D.C. Erection of 32 flats in Rectory Lane, Loughton. Council's Architects, Tooley and Foster, Midland Bank Chambers, Buckhurst Hill, Essex.

Colne Valley (Yorks) U.D.C. Revised layout of 128 houses and 24 flats on Corn Mill Field site has been approved.

Dartford T.C. Erection of 89 dwellings on Temple Hill Neighbourhood Unit. T. Armstrong, Town Clerk, High Street.

Ealing (Middx). It is proposed to erect Eliots Green secondary grammar school at Northolt. Estimated cost, £165,770.

Feltham (Middx). Approval sought for erection of first instalment of Lafone secondary school costing £163,560.

Gateshead T.C. Borough Engineer has been authorised to proceed with work of installing electricity in houses on Coulthards Lane estate. Some £2,470 is to be spent on the scheme.

Harrow. Schemes in hand for erection of Clamp Hill secondary school at cost of £176,100, and for extension of Chandos secondary schools at cost of £48,305.

Hartlepool T.C. Durham Co. planning officer has approved erection of 42 flats at Northgate and Union St., and 30 houses in Vane Street.

Helton (Dur.) U.D.C. Over 300 houses to be built during the next three years.

Heston and Isleworth (Middx). Hostel accommodation estimated to cost £110,050 is to be built at Maria Grey Training College.

Inverness T.C. Erection of 48 houses on Dalneigh site for Dept. of Health for Scotland. Burgh Architect, 11 High Street.

Ipswich T.C. Scheme approved for erection of £22,316 combined clinic in Meredith Rd., Whitton.

Jarrow-on-Tyne T.C. Loan sanction for £37,410 being sought for erection of 38 houses on S. Leam Lane estate.

Lambeth. L.C.C. have been recommended to approve development of York Hill estate extension to cost £40,315; and revised scheme for erection of 80 flats in five-storey blocks on Waltham estate costing £211,700.

Limavady. Construction of 72 dwellings in district for N. Ireland Housing Trust. Trust is at 12 Hope St., Belfast.

Margate T.C. Further 36 houses to be built on Hundreds Farm site.

Marlow U.D.C. Construction of 18 bungalows and 12 houses on Wethered Rd. site. Quantity Surveyors, H. Cooper and Sons, 6 The Forbury, Reading.

Middlesbrough. Kitching and Co., 21 Albert Rd., are architects for converting premises in Merton Rd. into Merchant Navy club. Project is estimated to cost £25,000.

Middlesbrough T.C. Negotiations proceeding with Building Trades Assoc. for erection of 96 houses at Park End.

Morden (Surrey). It is proposed to build 57 flats and 2 houses in Bishopsford on the St. Helier estate.

Newcastle-on-Tyne T.C. Erection of 72 flats on Kenton North estate. City Architect, 18 Cloth Market.

Newton Aycliffe. Development Corpn. is considering erection of cinema in the district.

N. Ireland. Construction of 159 dwellings at Finaghy, Belfast. N.I. Housing Trust, 12 Hope Street, Belfast.

Northumberland. It is proposed to spend £2,505 during current year on installing electric lighting in nine schools. County Council has approved suggestion. Also, a home for old people is to be built at Blyth.

Nottingham T.C. Erection of Milfords infants and junior schools at Clifton. R. M. Finch, City Engineer and Surveyor, The Guildhall.

Peterlee. Work is expected to begin in November on a new factory to be built by N. Eastern Trading Estates Ltd. for J. Amble and Sons. Architect is Prof. W. Halford. 80 Bedsford South, Liverpool 7.

Plymouth. Approval received for erection of Pembroke St. primary school and Tamerton Valley primary school.

Rowley Regis T.C. Erection of 64 houses on Brickhouse Farm estate. Borough Engineer and Surveyor, Municipal Buildings, Old Hill, Staffs.

Smethwick T.C. Extensions to Holly Lodge girls' grammar school have been approved. They will be included in next year's building programme.

South Shields T.C. Quantity surveyors for proposed Whiteleas secondary school and additions to Girls' High School are J. S. Glover, 13 Winchester St.

Stepney. Batger and Co. Ltd. are to rebuild confectionery factory in Cable St., E.1. Building licence has been granted.

Stepney. Building scheme amounting to £115,000 being considered for Leatherdale St. areas.

Stevenage. Plans in hand for junior and infants' school at Bedwell East costing £104,715, and junior school at Broom Barns to cost £49,043.

Sunbury-on-Thames. Proposed Sunbury secondary grammar school is estimated to cost £162,010. C.C. approval being sought.

Tottenham B.C. Approval sought for erection of £178,950 Markfield secondary school.

Wakefield (Yorks) R.D.C. Application to be made to borrow £20,800 for erection of 146 houses and bungalows at Crigglestone.

Whiston (Lancs). R.D.C. is seeking permission to borrow £329,124 for erection of 228 houses on Royal Oak site.

OVERSEAS

Portugal. ARCA-Armazeno da Camionagem Lda., of Rue Passos Manuel, 203-B, Oporto, are anxious to obtain agency of U.K. firm manufacturing batteries for motor vehicles.

NEW COMPANIES

Extracted from the Register issued by Jordan and Sons, Ltd., 116 Chancery Lane, London W.C.2.

Beam-echo Ltd., Coventry House, 3 South Place, E.C.2. Electrical and electronic engineers, etc. Cap.: £10,000. Dirs.: P. C. Hounsfield and H. M. Rahmer.

E.M.D. (Romford), Ltd., 49/51 St. Andrews Rd., Romford, Essex. Manufacturers, manufacturers' agents or distributors of electrical plant, equipment and fittings, electrical factory equipment, etc. Cap.:£5,000. Dirs.: H. Leek and Esther W. Leek.

Gledhow Autoparts Ltd., 3 Palace Ct., 250 Finchley Rd., N.W.3. Manufacturers of and dealers in automobile lorry and motor cycle electrical equipment, etc. Cap.: £100. Dirs.: M. Rivlin and Mrs. Z. L. Rivlin.

Lumitron Engineering Co. Ltd., 180 Shaftesbury Av., W.C.2. Electrical and mechanical engineers, electricians, scientific instrument makers, etc. Cap.: £100. Dir.: A. Moss.

J. Lund (Hydraulics) Ltd., Shelf House, Shelf, Bradford. Mechanical, hydraulic and electrical engineers, manufacturers of machinery and agricultural implements, etc. Cap.: £1,000. Dirs.: J. Lund and Winifred M. Lund.

Victor Morris and Co. Ltd., 42, Grand Parade, Green Lanes, N.4. Importers, exporters, manufacturers of and dealers in dynamos, motors, armatures, magnetos, batteries, conductors, electrical cables, etc. Cap. £5,000. Dir.: V. Morris and Miss P. S. Morris.

P.S.B. Instruments Ltd., 9 Cavendish Sq., W.1. Dealers in and suppliers, hirers, agents and manufacturers of scientific, mechanical, electrical, electronic atomic, radio, television and optical and other instruments, etc. Cap.: £150. Dirs.: W. D. W. Bowtle, G. W. Pearce, and L. T. Street.

Radio-Television (Alcombe) Ltd., 26 Alcombe Rd., Alcombe, Minehead, Somerset. To take over business carried on as "Alcombe Radio and Electrical Service." Cap.: £2,000. Dirs.: A. J. Ryan and Mrs. E. Rawle.

R.T.E. Factors Ltd., 20 Bloomsbury Sq., W.C.1. Distributors, dealers and factors in all types of electrical and mechanical apparatus and equipment, radio and television equipment, etc. Cap.: £1,000. Dirs.: F. G. Merkl and Jessie M. Merkl.

Shardlows (Clowne) Ltd., The Green, Clowne, nr. Chesterfield, Derbys. To take over business of Bottogas and electrical engineers and wholesale tobacconists carried on at Clowne, Derby, as "Shardlows" wireless, television, refrigeration, washing machine, elec, telephone, bottogas and general engineers.tobacconists,etc.Cap.: £4,000. Dirs.: J. S. Shardlow and C. Shardlow.

Joshua Shaw and Sons Ltd., Providence Mills, Bradford Rd., Batley. General, precision, mechanical, motor, aeronautical, electrical and marine engineers, etc. Cap.: £2,000. Dirs.: J. Shaw and S. Shaw.

W. Thompson and Son (Harrogate) Ltd., 6 Eleanor Rd., Harrogate, Yorks. To take over business of a plumber carried on at Harrogate by Wm. Thompson as "W. Thompson and Son," plumbers, sanitary, heating, hot water, mechanical, electrical, gas and general engineers, etc. Cap.: £600. Dirs.: W. Thompson, Mrs. M. Thompson, S. Thompson and Mrs. C. S. Thompson.

MEETINGS TO NOTE

TUESDAY, SEPT. 1

INCORP. PLANT ENGRS. (Edinburgh). "Factories Act '37 and '48, affecting Plant Engineers." Miss G. M. Mitchell, 25 Charlotte St., 7 p.m.

INCORP. PLANT ENGRS. (London Branch).—"Factories Act requirements affecting the Plant Engineer." H. Eccles. Royal Society of Arts, John Adam St., Adelphi, 7 p.m.

WEDNESDAY, SEPT. 2

INCORP. PLANT ENGRS. (Southampton). "Approach to Maintenance—Specialist Team's Visit to U.S." Colin Troup. Polygon Hotel, 7.30 p.m.

FRIDAY, SEPT. 4

SOUTHAMPTON ELECTRIC CLUB. Meeting at Polygon Hotel, 7 p.m.

TUESDAY, SEPT. 15

A.P.L.E. Annual Conference and Exhibition at Liverpool continues until Sept. 18.

EXHIBITION DIARY

Model Engr. Being held at New Horticultural Hall, Westminster, between Aug. 19 and 29.

Radio and Television. 20th Show at Earls Court opens on Sept. 1 and closes on Sept. 12.

Engineering, Marine and Welding. 19th Show opens at Olympia on Sept. 3 and continues until Sept. 17.

Electro Medical. This exhibition and the first International Congress of Physical Therapy opens at Central Hall, Westminster, on Sept. 7. It closes on Sept. 11.

TRADE MARKS

This information is extracted from the Official Journal by permission of the Controller

Blue Bead. 716,172. Class 9. Photographic flashbulbs. Philips Electrical Ltd., Century House, Shaftesbury Ave., W.C.2.

Blue Star. 713,930. Class 9. Electrical apparatus for controlling the use of fluorescent lighting systems by current control. Saxon Components Ltd., 66 Victoria St., S.W.1.

Duratherm. 719,065. Class 9. Insulated electric wire and cables. Duratube and Wire Ltd., Faggs Rd., Feltham, Middx.

Englit. 717,081. Class 9. Insulated electric cables and fitted flexible tubing being parts of vacuum cleaners. J. Engl Ltd., Treforest Trading Estate, Pontypridd, Glam.

Ensynamel. 716,608. Class 9. Electric wire covered with insulating enamel. Enfield Cables Ltd., Mill Marsh Lane, Brimsdown, Enfield, Middx.

Ever Ready Batteries for life in design 718,414. Class 9. Electric batteries. Ever Ready Co. (Gt. Britain) Ltd., Hercules Place, N.7.

Golden Spinney in design 717,707. Class 7. Cleaning, drying, hair-dressing, mangling, mincing machines, etc. Littlewoods Mail Order Stores Ltd., Waterloo Buildings, Cases St., Liverpool 1.

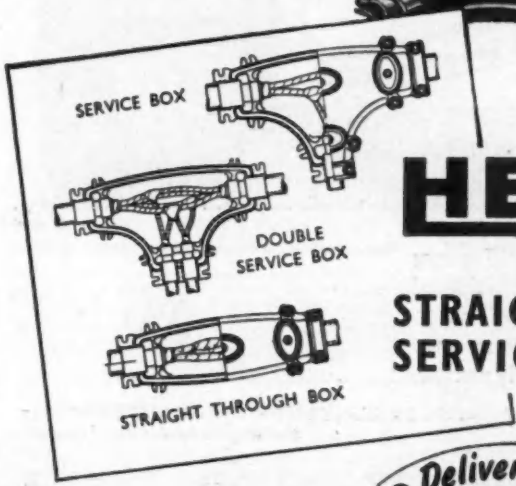
Halcyon. 717,482. Class 7. Floor polishing machines, spraying machines, etc. 717,483. Class 9. Electrically driven vacuum cleaning and polishing machines. Halcyon Radio Ltd., Sterling Works, Dagenham.

K-L. B702,285. Class 9. Apparatus for testing motor vehicle electric equipment. Key-Leather Co. Ltd., 6 Urswick Rd., E.9.

Micatherm. B718,525. Class 11. Electrical heating appliances made principally of mica. Mycalex Co. Ltd., Ashcroft Rd., Cirencester, Glouces.

The design of HENLEY Cablegrip type Boxes is based on years of experience of practical jointing conditions, and incorporates many features which facilitate jointing operations.
The range includes Straight Through, Service and Branch Boxes for underground installation, each of them incorporating the Cablegrip gland and armour clamp.

Ask for Catalogue 26



HENLEY

CABLEGRIP

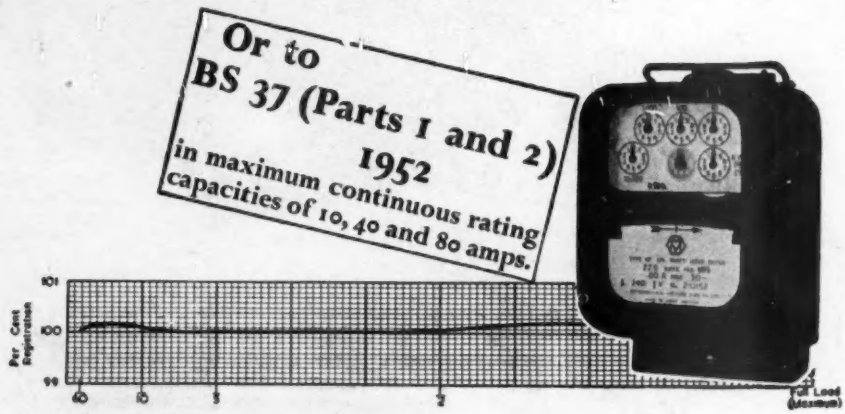
STRAIGHT THROUGH SERVICE & BRANCH BOXES

Delivery from stock

W. T. HENLEY'S TELEGRAPH WORKS CO. LTD., 51-53 HATTON GARDEN, LONDON, E.C.1

Metrovick Type NF Meters

Available either to
BS 37—1937
in long range capacities of
2½, 5, 10, 25 and 50 amps.
Per cent Registration
99
0 5 10 20 50 100 200
Per cent Full Load



In designing the Type NF meter Metrovick engineers anticipated the requirements of the 1952 specification, consequently the two patterns are fundamentally similar.

METROPOLITAN-VICKERS ELECTRICAL CO. LTD., TRAFFORD PARK, MANCHESTER 17
Member of the A.E.I. group of companies

METROVICK *equipment for meticulous metering*

G/A201

CLASSIFIED ADVERTISEMENTS

OFFICIAL TENDERS AND APPOINTMENTS

WORK WANTED WANTED · FOR SALE

Those wishing to advertise in these pages should send the text to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia Street, London W.C.2, before 10 a.m. on TUESDAY of week of issue. Official Displayed Advertisements are charged at 42s. per inch, and all other classified advertisements at 3s. per line. Situations Wanted will be published four times for twice the single insertion rate. Fee for Box No. and postage on replies is 2s.

TENDERS INVITED

COUNTY BOROUGH OF SWANSEA

Education Committee

Swansea Technical College

SUPPLY OF REFRIGERATION PLANT

TENDERS are invited for the supply and delivery of REFRIGERATION PLANT (EXPERIMENTAL) to be motor-driven on a 50 cycle a.c. supply, 240 volts, the refrigerant to be methyl chloride and/or Freon 12 without brine with a secondary medium; the unit to have a capacity of approximately 7,000 B.Th.U. per hour at 30°F. evaporation (with condenser water inlet at 65°F.), and to be supplied complete with gauges, etc.

Further particulars may be obtained from the undersigned. Tenders must be returned not later than 12 noon on August 25, 1953.

No tender will be considered unless it is enclosed in a plain sealed envelope which shall bear the words "Technical College—Tender for Miscellaneous Equipment," but shall not bear any name or mark indicating the sender.

The Education Committee do not bind themselves to accept the lowest or any tender.

L. J. DREW,
Director of Education.

Education Department,
Guildhall,
Swansea.
August, 1953. (E 614)

CITY OF MANCHESTER

THE HEALTH COMMITTEE invite tenders for Rewiring of the ELECTRICAL INSTALLATION at "Ashton House," Hostel for Women, Corporation Street, Manchester 4. Specification drawing and tender form may be obtained from the City Architect, Town Hall. Deposit £1 1s. (returnable). Tenders, sealed in endorsed envelopes, must be delivered 10 a.m. on Monday, September 7, 1953.

PHILIP B. DINGLE,
Town Clerk.

August 14, 1953. (E 647)

APPOINTMENTS VACANT

Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, or a woman aged 18-59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.

YORKSHIRE ELECTRICITY BOARD

FOREMAN LINESMAN required in the Grimsby District. £340 per annum.

LINESMEN AND LINESMEN'S MATES required in the Grimsby District, also in the Scunthorpe and Gainsborough Districts operating from the Brigg Depot. Rate of pay: Linesmen 3s. 6d. per hour, Mates 3s. 1d. per hour, for a 44-hour, 5-day week. N.J.I.C. conditions of service.

Applications, giving full details of age, training and experience, should be forwarded to the Manager, No. 7 (Grimsby) Sub-Area, Yorkshire Electricity Board, Moss Road, Grimsby. (E 620)

READVERTISEMENT

CITY OF SALISBURY

Southern Rhodesia

APPLICATIONS are invited for the following fixed establishment post in the Electricity Department of the above Municipality:—

GENERATION ENGINEER (salary scale £1,600 by £50 to £1,800 p.a.). Applicants must have had extensive experience in the operation and control of large steam generating plants, preferably including experience with pulverised fuel fired boilers and must be fully qualified mechanical and electrical engineers.

The above appointment is subject to Council's Service and Leave Regulations, which will be made available for inspection by selected candidates at the offices of the undersigned. The salary payable will commence at the minimum of the above grade, rising by annual increments to the maximum salary of the grade (no cost-of-living or other allowances are payable).

The successful candidate must be able to comply with the regulations of the Southern Rhodesia Immigration Authorities, and will be required to submit a satisfactory medical certificate.

Applicants, who should not be more than 45 years of age, are requested to submit full particulars of their qualifications, training and experience, giving details of positions held and salaries received, marital state, age, place of birth and nationality. Copies of not more than three recent testimonials may be included.

Canvassing, directly or indirectly, will be a disqualification.

Applications, suitably endorsed on the cover, must reach the office of the undersigned on or before Saturday, September 5, 1953. Airmail paper should be used.

DAVIS AND SOPER, LTD.,
Agents to the City Council of Salisbury.
52 and 54 St. Mary Axe,
London, E.C.3.
August 6, 1953. (E 569)

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

COMMERCIAL ASSISTANT (TECHNICAL) required in the Warrington District. Salary £548 to £566 per annum (N.J.B. F.11).

Applicants must have had an engineering training and be in possession of a Higher National Certificate in electrical engineering, be Graduate Members of the I.E.E. or possess such other similar qualification as may be approved by the Board.

The duties of the post will include estimating for contracting work, advising consumers on matters relating to electricity supply and consuming appliances, etc.

The appointment will be superannuable and subject to medical examination.

Standard application forms obtainable from the Manager, No. 2 Sub-Area, Electricity House, Sandiway, near Northwich, Cheshire. Closing date August 31, 1953. (E 606)

BRITISH ELECTRICITY AUTHORITY

Midlands Division

SENIOR DRAUGHTSMAN (electrical) is required in the Generation Construction Department at Divisional Headquarters, N.J.B. service conditions, superannuable appointment, salary within Schedule "D, Grade 5, £587 to £671 per annum.

A sound technical training is required and practical experience in the preparation of layouts and diagrams in connection with the installation of h.v. and l.v. switchgear, transformers, distribution gear and control panels. Experience should also include the determination of sizes, routing and scheduling of auxiliary and control cables.

Apply on forms available from the Establishments Officer, 53 Wake Green Road, Moseley, Birmingham 13, by September 8, 1953. (E 622)

BRITISH ELECTRICITY AUTHORITY

London Division

APPLICATIONS are invited for the following superannuable posts. Salary, including London Allowance, and conditions of service in accordance with N.J.B. Agreement, Schedule "A." Qualifications entitling to Graduate Membership of the I.E.E. or I.Mech.E. an advantage.

ASSISTANT ENGINEER (SHIFT)
Barking "A" and "B" Generating Station

Sound technical education and experience in the operation of e.h.t. switchgear, station auxiliaries and the control of large turbo-alternators. The duties will be those of First Assistant to the Station Shift Control Engineer in charge of the Control Room. Salary, Class "M," Grade 12, £740 5s. p.a.

ASSISTANT ENGINEER (EFFICIENCY)
Deptford East Generating Station

Candidates should have had sound engineering training. Duties will consist of plant testing, investigation of technical problems and general responsibility for station efficiency. Salary, Class "H," Grade 13, £549 3s. p.a.

STATION SHIFT CONTROL ENGINEER
Stepney Generating Station

Good technical qualifications to H.N.C. standard or equivalent, with sound technical training and practical experience in the control and operation of steam generating plant and high voltage switchgear. Salary, Class "F," Grade 10, £605 17s. p.a.

Application may be made on form obtainable from Divisional Secretary, B.E.A. London Division, Generation House, Great Portland Street, W.1, and be received within 14 days of this advertisement. (E 617)

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

No. 4/5 Sub-Area

APPOINTMENT OF FOUR COMMERCIAL ASSISTANTS
(Technical)

APPLICATIONS are invited for the positions of Commercial Assistants based at the following District Offices at a salary within the range £524 to £540 p.a. (N.J.B. Schedule Class "E," Grade 11):—

Caernarvon, Crewe, Oswestry and Rhuddlan.

The primary duties will be farm utilisation in the above districts. Applicants should have had an engineering training and be able to quote for wiring and be conversant with sales and hire purchase schemes. They should be able to drive a light van, and for Caernarvon and Oswestry should preferably be able to speak Welsh.

The appointments will be superannuable and subject to medical examination.

Application forms obtainable from the Manager, No. 4/5 Sub-Area, Merseyside and North Wales Electricity Board, Electricity House, Rhostyllen, near Wrexham. Closing date: September 1, 1953. (E 626)

BRITISH ELECTRICITY AUTHORITY

Yorkshire Division

SECOND ASSISTANT STATION CHEMIST required at Doncaster (New) Power Station.

Salary £548 to £565 per annum, Class "F," Grade 11; rising ultimately to £573 to £596 per annum, Class "G," Grade 11, N.J.B. Agreement.

Applicants should hold Higher National Certificate in Chemistry and have had experience of the testing and analysis of waters, fuels and oils. Previous power station experience is desirable, especially with regard to modern water treatment plant.

Applications on form A.E.6, obtainable from Divisional Secretary (Establishments), British Electricity Authority, British Electricity House, St. Mary's Road, Leeds 7, to be returned within 10 days of the appearance of this advertisement.

G. A. VOWLES,
Divisional Controller.
(E 621)

MIDLANDS ELECTRICITY BOARD

THIRD ASSISTANT DISTRICT ENGINEER required in the Gloucester District of the Central Gloucestershire Sub-Area. Experience necessary in all branches of distribution work including the operation and maintenance of high and low voltage, underground and overhead distribution systems. Technical qualifications desirable. Salary, £587 to £600 per annum (N.J.B. Class "E," Grade 9), superannuable.

Apply within 14 days stating age, experience, present salary and position and quoting reference T/173, to Sub-Area Manager, Midlands Electricity Board, 126 London Road, Gloucester.

A. STEPHENS,
Secretary.
(E 634)

BRITISH ELECTRICITY AUTHORITY

South-West Scotland Division

POWER STATION SUPERINTENDENT
Dalmarnock

APPLICATIONS are invited for the position of Power Station Superintendent at Dalmarnock Power Station.

Candidates should preferably be Corporate Members of the Institution of Mechanical Engineers or of the Institution of Electrical Engineers, with technical and practical experience of the operation and maintenance of a modern steam generating station with an eventual capacity of 240 MW. They should also have had experience in the administrative duties involved and in the handling of technical and manual employees.

The salary will be in accordance with Grade 1, Class "J" of Schedule "A" of the National Joint Board Agreement and will be subject to deductions in respect of superannuation.

Applications, on Form A.E.6, may be obtained from the Authority's Headquarters or from any Divisional Office of the Authority, and should be forwarded to the Divisional Secretary, 168 Broomhill Drive, Glasgow W.1, before September 14, 1953.

A. CHRISTIANSON,
Divisional Secretary.
August 10, 1953. (E 602)

LONDON ELECTRICITY BOARD

SENIOR DEVELOPMENT ASSISTANT

APPLICATIONS are invited for the above position in the Hampstead District of the North Western Sub-Area.

Applicants are required to have a sound knowledge of all aspects of service to consumers and be capable of planning and estimating for domestic, commercial and small industrial installations. They should possess a good knowledge of electrical apparatus and the basic principles of tariffs and their application.

The post is graded within the National Joint Council Agreement (Administrative and Clerical Grades) as Grade 2, i.e., £460 to £520 per annum plus the appropriate London Area Allowance.

Application forms from Establishments Officer, 46 New Broad Street, London E.C.2, to be returned completed by August 29, 1953. Please enclose addressed foolscap envelope and quote Ref. V/1631/T. (E 601)

SOUTH EAST SCOTLAND ELECTRICITY BOARD

Edinburgh Sub-Area

APPLICATIONS are invited for the position of DEMONSTRATOR (Female) in the Edinburgh Sub-Area.

Applicants should possess a recognised diploma or certificate in Domestic Science, also the E.A.W. Certificate. The successful applicant will be required to conduct lectures and demonstrations, advise consumers and generally assist in Service Centres.

The salary will be Grade 1 of the N.J.C. Agreement, at present £380 to £470 per annum.

Applications, stating age, qualifications and experience, should be forwarded within 14 days to:

G. T. ALLCOCK,
Edinburgh Sub-Area Manager.

South East Scotland Electricity Board,
3 Dewar Place,
Edinburgh 3. (E 604)

NORTH WESTERN ELECTRICITY BOARD

APPOINTMENT OF CHIEF ACCOUNTANT

APPLICATIONS are invited for the position of Chief Accountant to the Board at a commencing salary of £2,700 per annum.

Applicants must possess a recognised accountancy qualification and have wide experience in a senior accountancy position, preferably within the electricity supply industry, with financial administrative responsibility.

Applications, stating age, qualifications, experience, present post and salary, should be received by the Establishment Officer, The North Western Electricity Board, Cheetwood Road, Manchester 8, not later than September 11, 1953. (E 603)

BRITISH ELECTRICITY AUTHORITY

Midlands Division

MAINTENANCE ENGINEER (Electrical) is required at Walsall Power Station. N.J.B. service conditions, superannuable appointment, salary within Schedule "A," Grade G.6, commencing at £787 per annum.

A sound technical training and practical experience in power station electrical maintenance is required and preferably the possession of appropriate technical qualifications.

Apply on forms available from the Establishments Officer (or on Forms AE.6 or M.D.5), 53 Wake Green Road, Moseley, Birmingham 13, by August 28, 1953. (E 630)

BRITISH ELECTRICITY AUTHORITY

Eastern Division

APPLICATIONS are invited for the following posts:

JUNIOR ENGINEER
Cliff Quay Generating Station
Salary, Class "K," Grade 19, £402 to Grade 15, £545 per annum.

JUNIOR ENGINEER
Peterborough Generating Station
Salary, Class "F," Grade 15, £402 to Grade 14, £406 per annum.

Commencing salaries depending on qualifications and experience.

The duties of the successful applicants will include assisting in the Control Room on shift and other operation and investigation duties. Preference will be given to applicants who have had previous experience in a generating station and who have reached the standard of the Ordinary National Certificate in electrical engineering or its equivalent.

Applications, stating age, qualifications and experience, should be sent to the Divisional Controller, British Electricity Authority, Eastern Division, Northmet House, Southgate, N.14, by August 29, 1953.

W. N. C. CLINCH,
Controller.
(E 616)

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

SYSTEM CONTROL ENGINEER (Shift) required in the No. 4/5 Sub-Area Operation Department and based on the Control Centre at Legacy, near Wrexham. Salary £680 to £706 per annum (N.J.B. Class "J," Grade 10).

Duties, which will be on a continuous shift basis, will be those normally associated with switching operations and load transfers on an extensive e.h.v. system interconnecting 132/33 kV injection points and a number of hydro-electric stations.

Applicants should have had operational experience in distribution work and in substations, and possess the technical qualifications necessary to enable them to become chartered electrical engineers.

The appointment is superannuable and subject to medical examination.

Standard application forms obtainable from the Manager, No. 4/5 Sub-Area, Electricity House, Rhostyllen, near Wrexham. Closing date August 31, 1953. (E 606)

BRITISH ELECTRICITY AUTHORITY

Midlands Division

DEPUTY POWER STATION SUPERINTENDENT is required at Wolverhampton Generating Station. N.J.B. service conditions, superannuable appointment, salary within Schedule "A," Grade "E3," commencing at £858 per annum, plus £60 load control duties.

A wide knowledge of power station operation and maintenance is essential, and the successful applicant will be required to assume full responsibility for the operation of the station in the absence of the Station Superintendent. Appropriate technical qualifications will be an advantage.

Apply on forms available from the Establishments Officer (or on Form AE6), 53 Wake Green Road, Moseley, Birmingham 13, by September 5, 1953. (E 623)

BRITISH ELECTRICITY AUTHORITY

North Western Division

VACANCY No. 177/53. GENERAL ASSISTANT ENGINEER in System Operation Department at British Electricity House, Manchester. Salary range £501 to £714 (AX/EX 8).

Vacancy No. 179/53. STATION SHIFT CONTROL ENGINEER at Wigan Generating Station. Salary £531 to £547 (D.10).

Vacancy No. 180/53. STATION SHIFT CONTROL ENGINEER at Barrow Generating Station. Salary £531 to £547 (D.10).

Applications to Establishments Officer, British Electricity House, 825 Wilmslow Road, Manchester 20, before August 29. Please quote Vacancy No. (E 618)

SOUTH WALES ELECTRICITY BOARD

REQUIRED, a SENIOR ASSISTANT (Low Voltage Development) in the Commercial Department of the Eastern Sub-Area at Newport.

Salary in accordance with Class "J," Grade 4 (£1,026 to £1,048 to £1,071) of the N.J.B. Schedule.

Applications stating age, present position and salary, qualifications and experience, and giving three referees, to be addressed to the Secretary to arrive by August 29, 1953.

D. G. DODDS,
Secretary.

St. Mellons,
Cardiff. (E 631)

YORKSHIRE ELECTRICITY BOARD

APPLICATIONS are invited for the following appointments:

No. 1 (Bradford) Sub-Area

THIRD ASSISTANT ENGINEER
(Construction and Maintenance)

Applicants should be corporate members of the Institution of Electrical Engineers or hold other acceptable technical qualifications, and should have good experience in the construction and maintenance of extensive complete overhead and underground systems operating at voltages up to 66 kV. The post involves participation in standby duties.

Salary, N.J.B. Class "K," Grade 10, £719 to £730 per annum.

Applications, giving full details of age, qualifications and experience should be forwarded to the Manager, No. 1 (Bradford) Sub-Area, Yorkshire Electricity Board, 45-53 Sunbridge Road, Bradford, not later than September 3, 1953.

No. 7 (Grimsby) Sub-Area

Grimsby District
SECOND ASSISTANT DISTRICT ENGINEER

Applicants should preferably be corporate members of the Institution of Electrical Engineers, or hold equivalent qualifications. They must have had a sound training and extensive experience in the design, construction, operation and maintenance of h.v. and l.v. underground and overhead distribution systems both in urban and rural areas, substation plant and ancillary equipment.

Salary, N.J.B. Class "F," Grade 7, £697 to £710 per annum.

No. 7 (Grimsby) Sub-Area

THIRD ASSISTANT ENGINEER (Distribution Design)
THIRD ASSISTANT ENGINEER (Construction)

Applicants should preferably be corporate members of the Institution of Electrical Engineers, or hold other equivalent qualifications. They should have experience in the design, construction, operation and maintenance of h.v. and l.v. overhead and underground distribution networks, substation plant and ancillary equipment, and short circuit calculations.

Salary, N.J.B. Class "G," Grade 10, £608 to £630 per annum.

Applications, giving full details of age, qualifications and experience, should be forwarded to the Manager, No. 7 (Grimsby) Sub-Area, Yorkshire Electricity Board, Moss Road, Grimsby, not later than September 3, 1953.

No. 5 (Wakefield) Sub-Area

Castleford District
GENERAL ASSISTANT DISTRICT ENGINEER
(two posts)

Applicants should preferably be graduate members of the Institution of Electrical Engineers and have experience in the construction, operation and maintenance of overhead and underground distribution systems.

Applicants should be prepared to reside in the district and undertake standby duties.

Salary, N.J.B. Class "R," Grade 11, £524 to £550 per annum.

Applications, giving full details of age, qualifications and experience, should be forwarded to the Manager, No. 5 (Wakefield) Sub-Area, Yorkshire Electricity Board, 1a Denby Dale Road, Wakefield, not later than September 3, 1953. (E 619)

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

No. 4/5 Sub-Area

APPOINTMENT OF THREE COMMERCIAL ASSISTANTS
(Technical)

COMMERCIAL ASSISTANT (Technical) based on the District Office, Wrexham, salary in accordance with N.J.B. Schedule, Class "F," Grade 11 (£546 to £565 p.a.).

Two Commercial Assistants (Technical) based on the District Office, Oswestry, salary in accordance with N.J.B. Schedule, Class "E," Grade 11 (£524 to £540 p.a.).

The successful candidates will be employed on work in connection with the Board's Rural Development Programme and they should have experience in rural development preparation of estimates for contracting work, sales, hire purchase and general work of a commercial nature.

The ability to speak Welsh will be an added qualification for the positions in the Oswestry District.

The appointments will be superannuable and subject to medical examination.

Application forms obtainable from the Manager, No. 4/5 Sub-Area, Merseyside and North Wales Electricity Board, Electricity House, Rhostyllen, nr. Wrexham, should be returned not later than September 1, 1953. (E 620)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

APPLICATIONS are invited for the following positions within the Division:—

CIVIL ENGINEERING DRAUGHTSMEN
Construction Department. Vacancy No. 22/53

Candidates should have experience in design and detail of reinforced concrete structures, piled and slab foundations for heavy plant, culverts, cable subways, etc., for general building construction drainage and sanitation schemes, associated with office and administrative buildings.

The salary will be in accordance with Grade 5 (£567 to £671 per annum) or Grade 6 (£433 to £567 per annum) of Schedule "D" of the National Joint Board Agreement.

ENGINEERING DRAUGHTSMEN (MECHANICAL)
Construction Department. Vacancy No. 44/53

Senior Draughtsmen are required in the Mechanical Section of the Construction Department at North Wilford Power Station. Candidates should have experience in one or more of the following:—

(i) Design and layout of power station equipment, including turbo-alternators, boiler plant, coal and ash plant, and general station auxiliaries.
(ii) H.p. and l.p. steam and feed pipework. Condensing plant and feed heating systems.
(iii) Conveyor plant, coal handling systems and material handling of station auxiliary equipment.

Salary and conditions of service will be in accordance with the National Joint Board Agreement Grade 5 (£567 to £671 per annum) and Grade 6 (£433 to £567 per annum) of Schedule "D," according to experience.

ENGINEERING DRAUGHTSMEN (ELECTRICAL)
Construction Department. Vacancy No. 61/53

Candidates should have experience in the preparation of layouts and diagrams for the installation of e.h.t. and l.t. switchgear, transformers, e.h.t. and l.t. cables; knowledge of protective gear systems would be an advantage.

The salary will be in accordance with Grade 5 (£567 to £671 per annum) or Grade 6 (£433 to £567 per annum) of Schedule "D" of the National Joint Board Agreement.

SECOND ASSISTANT ENGINEER (ELECTRICAL)
General Construction Department, Divisional H.Q.
Vacancy No. 86/53

Preference will be given to applicants who hold a degree in electrical engineering, are Corporate Members of the Institution of Electrical Engineers, or possess other equivalent qualifications.

Applicants should have had experience in the design and installation of turbo-alternators, switchgear, transformers, cables and ancillary equipment up to 33 kV, and other electrical equipment associated with modern power stations.

Experience in the preparation of specifications, estimates and the analysis of tenders is essential.

The salary will be within Schedule C, Class "AX/DX," Grade 2 (£834 to £1,063 per annum) of the National Joint Board Agreement.

The closing date for the receipt of applications will be September 8, 1953.

SECOND ASSISTANT ENGINEER (MECHANICAL)
Generation Department, Divisional Headquarters.
Vacancy No. 87/53

Preference will be given to applicants who hold a degree in mechanical engineering, are Corporate Members of the Institution of Mechanical Engineers, or possess equivalent qualifications.

Applicants should be experienced in the design and construction of turbo-alternators, boilers, coal and ash handling plant, high pressure steam and water piping and other ancillary work.

Experience in the preparation of specifications, estimates, analysis of tenders, and a knowledge of thermodynamics and hydraulics will be a recommendation.

The salary will be within Schedule "C," Class "AX/DX," Grade 2 (£834 to £1,063 per annum) of the National Joint Board Agreement.

The closing date for the receipt of applications for this appointment will be September 8, 1953.

The above positions will be pensionable within the provisions of the British Electricity Authority and Area Boards Superannuation Scheme.

Applications should be submitted on the official form which may be obtained from the Divisional Establishments Officer, British Electricity Authority, Barker Gate, Nottingham, and should be returned to the undersigned by the dates stated. Please quote Vacancy Number.

L. F. JEFFREY,
Divisional Controller.
(E 632)

A SENIOR and JUNIOR DRAUGHTSMAN required for work on electrical power resistances and large electrical heaters for industrial applications. Previous experience on this class of work desirable but not essential.—Apply by letter with full details, including age, technical qualifications, whether married or single, and salary required, to The Expanded Metal Co., Ltd., Stranton Works, West Hartlepool. (E 584)

ALLEN WEST AND CO., LTD., require for their Brighton Sales Department, senior SALES ENGINEERS. Must have held similar positions and be conversant all types motor control gear, especially contactor gear.—Applications stating qualifications, experience and salary required to J. H. Hall. (E 504)

ASSISTANT FOREMAN required to supervise maintenance work on plant engaged in manufacture of photographic material. Good general engineering background with supervisory experience essential, together with a specialised knowledge of electrical control circuits, a.c. and d.c., machinery and associated starting equipment. Only men prepared to work under fairly arduous conditions and to a consistently high standard need apply. The position will be permanent and progressive to the right man. The company operates a non-contributory pension, insurance and sickness benefit plan. Salary £650 to £750 per annum.—Write, with full details, to Personnel Department, Kodak Ltd., Wealdstone, Middlesex. (E 635)

B.B.C. requires ENGINEER in wiring unit of planning and installation department based London. Salary £590 to £800. To plan, prepare estimates and specifications, conduct correspondence, for low/medium pressure electrical installation work in studios and offices; and to supervise and test work of contractors. Considerable experience similar work essential; electrical apprenticeship desirable. Must be willing to travel throughout U.K.—Applications to Engineering Establishment Officer, B.B.C., London W.1, within 7 days. (E 625)

BRITISH ELECTRICITY AUTHORITY require an ADMINISTRATIVE OFFICER in the Organisation and Methods Unit at their London Headquarters. Candidates should preferably have had previous experience as a member of an Organisation and Methods team and be competent in all aspects of O. and M. work. The appointment, which is superannuable, will be made within a provisional salary scale, £975 by £40 to £1,325 p.a. including London Allowance.—Applications, stating salary and previous experience, to D. Moffat, Director of Establishments, Winsley Street, London W.1, by September 1, 1953. Quote Reference AE/407. (E 615)

DEPUTY POWER STATION SUPERINTENDENT required for service with the Sudan Light and Power Co., Ltd. in Khartoum. Anglo-Egyptian Sudan. Basic salary on appointment £E.1,500 per annum (£E.1=£1 7s. 6d.). Candidates should be between the age of 30 and 40 and must be corporate members of the Institution of Mechanical Engineers; have had not less than 10 years' experience in the design, construction and operation of modern power stations equipped with boilers and turbo-alternators operating under steam conditions up to 400 lb. per sq. in. in pressure and 750 deg. F. superheat: and e.h.t. switchgear and associated control equipment. Corporate membership of the I.E.E. and experience with oil-fired boilers and diesel alternators up to 1,200 kW also most desirable. Evidence should be adduced of having held positions of responsibility requiring organising and administrative powers and the ability to control staff. Initially duties will include relieving the Power Station Superintendent of day-to-day administrative work in the existing diesel power station and supervising the erection and equipping of a steam station.

In addition to basic salary a cost-of-living allowance will be payable, and a kit allowance of £E.50 on appointment.

Appointment will be on contract up to 10 years, including a period of 12 months probation, with a bonus payable on completion of the contractual period. Free living accommodation with basic furniture or an allowance in lieu thereof and free transport will be provided. After satisfactory completion of the probationary period liberal leave on full salary with free passages. There is at present no income tax in the Sudan.

Applications stating age, education, qualifications, experience (with particulars of posts held), present appointment and salary with names of two references should be submitted to the Secretary, The Power and Traction Finance Co., Ltd., Queens House, Kingsway, London W.C.2. (E 595)

ELECTRICAL FITTER/WIREMAN required. Experience with a.c. and d.c. automatic multi-panel control gear essential. First-class working conditions, canteen and recreational facilities.—Applications to: Labour Manager Marshall, Sons and Co., Ltd., Britannia Works, Gainsborough, Lincs. (E 636)

ELECTRICIANS required for Power Station work in the Midlands. Must be accustomed to copper-sheathed cable installations.—Applications, in writing, giving details of age and experience, to Employment and Welfare Manager, Messrs. Johnson and Phillips Ltd., Victoria Works, Charlton, London S.E.7. (E 607)

BOX No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London W.C.2

ESTIMATING (SALES) CLERK (male), age 21 to 30, required. Good standard in maths and general education essential. Progressive, superannuable. Sports. Permanency for right man.—Apply, Personnel Officer, Southern United Telephone Cables, Ltd., Dagenham Dock, Essex. (E 637)

HEAL AND SON, LTD., invite applications from experienced SALESMEN for their electrical department. A knowledge of radio and television an advantage. —Apply in writing to Staff Manager, 196 Tottenham Court Road, W.1. (E 634)

HEAVY electrical engineering firm, Manchester area, requires SALES ENGINEER with experience in tendering, holding at least Higher National Certificate. Interesting work and good prospects.—Apply, in writing, stating age, experience and salary required, marking envelopes "Sales Engineer," to Box No. 2827, Electrical Times. (E 518)

INSTRUMENT MECHANICS/ENGINEERS with experience in the overhaul, construction and calibration of electrical instruments, preferably aircraft instruments, are required by Field's of Bovingdon Airport, Herts. Good pay and pleasant working conditions. Canteen and sports facilities.—Full details in writing to Personnel Officer, Field Aircraft Services, Ltd., Croydon Airport. (E 638)

LONDON TRANSPORT require turbine house ENGINEER for efficient operation and testing of steam turbo alternators and associated auxiliary plant. Qualifications: Sound knowledge of operating conditions of modern generating station, technical training and practical experience necessary to carry out duties. Corporate membership of recognised engineering institution or equivalent qualification advantageous. Salary range £770 to £820. Medical examination, contributory superannuation scheme after probation.—Applications within 14 days to Staff Officer (F/EV.251), London Transport, 55 Broadway, S.W.1. For acknowledgment enclose addressed envelope. (E 608)

MEDIUM-SIZED rapidly expanding electrical accessory manufacturers require enthusiastic REPRESENTATIVE for London and Home Counties. Must be car owner with established connections amongst wholesalers, Electricity Boards and large users. Good prospects with ultimate promotion to Area Manager.—Reply, giving details of salary expected, to Box No. 2845, Electrical Times. (E 626)

METER MANUFACTURERS, N.W. London, require SENIOR AND JUNIOR TEST ENGINEERS for progressive posts in their test depts. State education, technical training, experience, salary required.—Box 2839, Electrical Times. (E 567)

OPPORTUNITIES FOR YOUNG MEN who wish to make careers in sales/contracts engineering are available with The English Electric Co., Ltd., at their Liverpool Works. Candidates should have received practical engineering training, have completed military service and possess H.N.C. electrical or equivalent. The work is of an interesting nature, being concerned with the supply of high rupturing capacity fusegear to all types of industrial and power supply undertakings. Training would be given to suitable applicants. These positions are permanent and pensionable and offer good prospects of advancement.—Write, quoting ref. 443D, to Dept. C.P.S., 336-7 Strand, W.C.2. (E 639)

PROFESSIONAL ENGINEERS IN VARIOUS GOVERNMENT DEPARTMENTS. The Civil Service Commissioners invite applications for about 80 pensionable posts in a wide variety of mechanical and electrical engineering duties. Applications will be accepted up to September 30, 1953.

Candidates must be under 35 on January 1, 1953, with extension for regular service in H.M. Forces and up to two years for permanent civil service. For the Post Office they must be at least 21, for the Ministry of Supply and Ministry of Civil Aviation at least 23, and for all other Departments at least 25 on that date.

Generally a candidate must possess a university degree in engineering or be a Corporate Member of one of the professional institutions—mechanical engineers, electrical engineers, or civil engineers or have passes in, or exemption from, Sections "A" and "B" of the corresponding Associate Membership examinations. Exceptionally candidates of high professional attainment, but without the specified qualifications, may be admitted. For some posts Associate Fellowship of the Royal Aeronautical Society or an honours degree in physics will be accepted.

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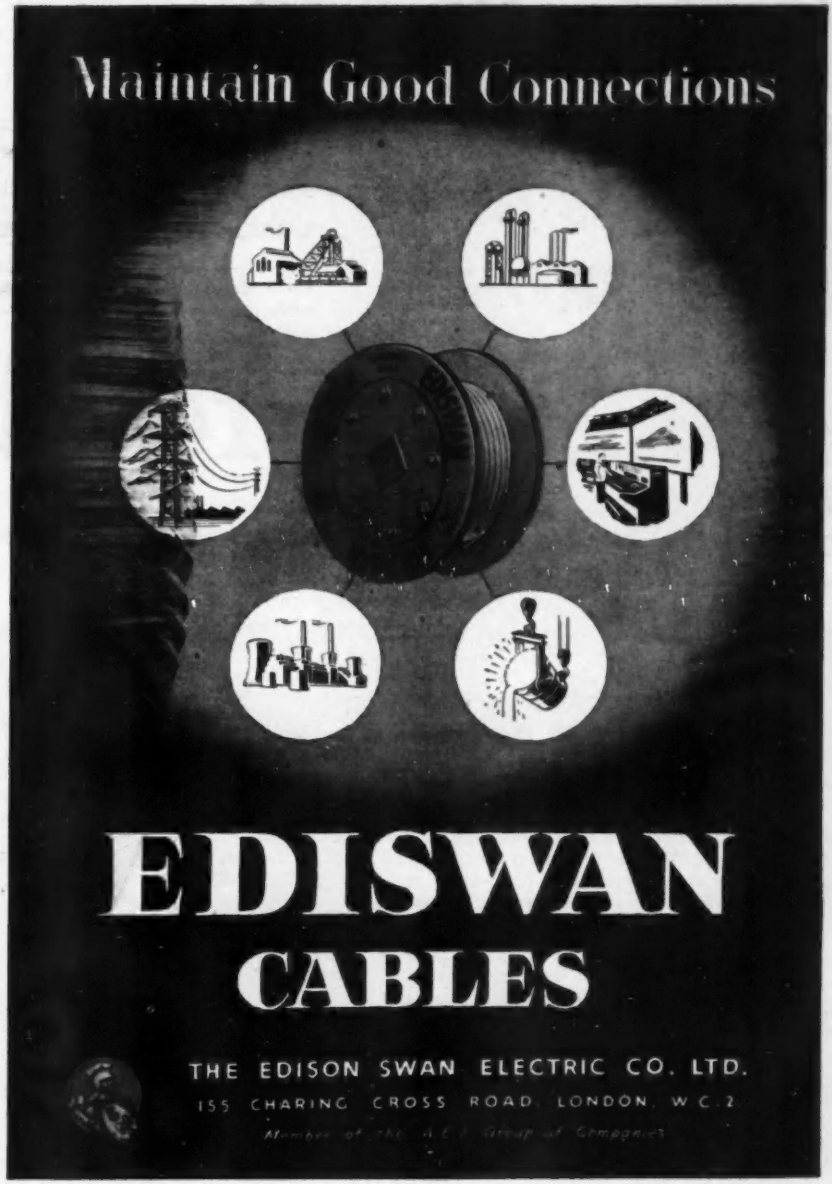
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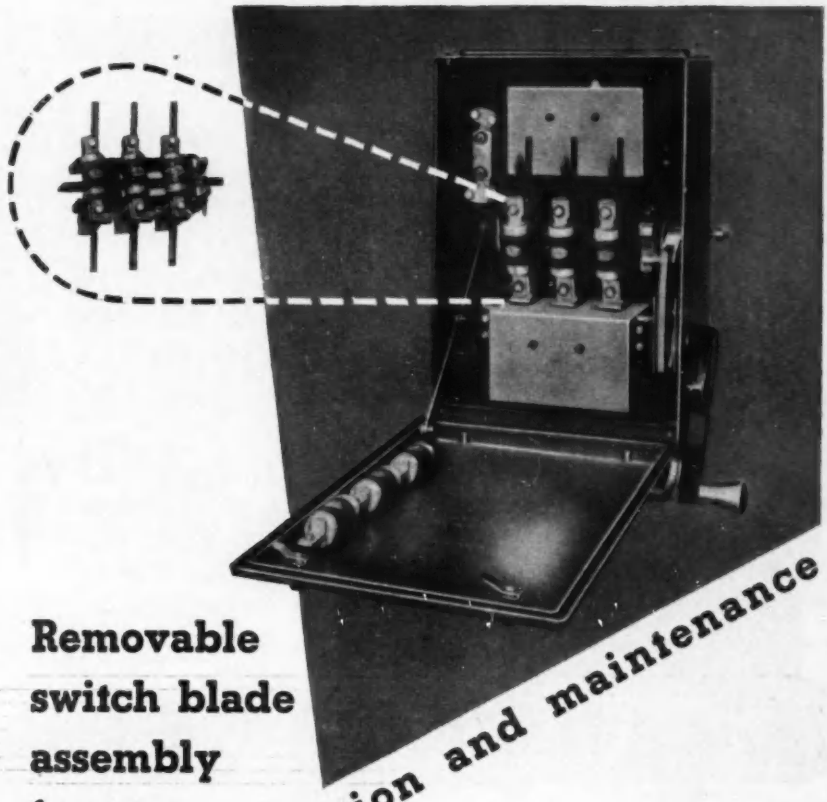

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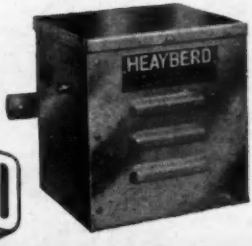

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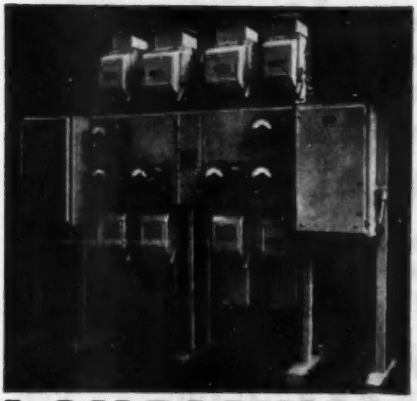

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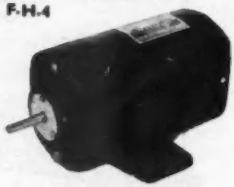

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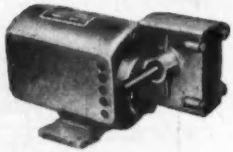

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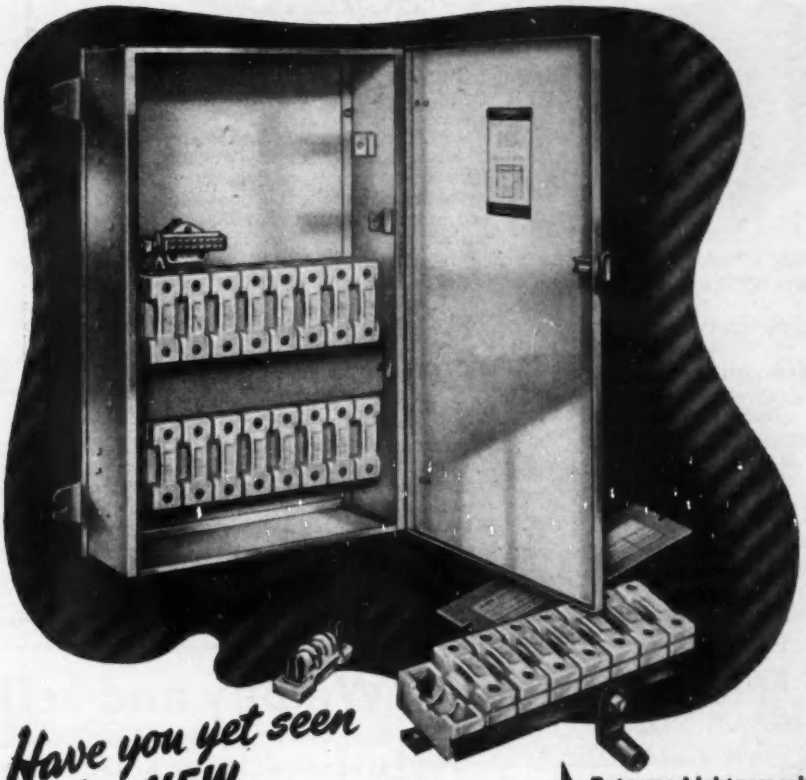

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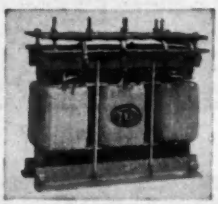

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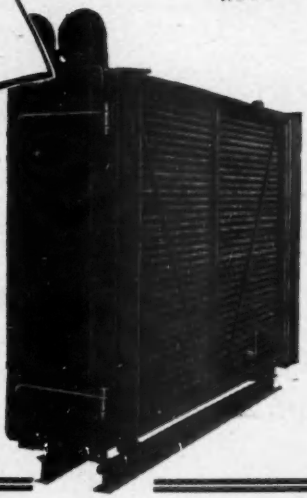

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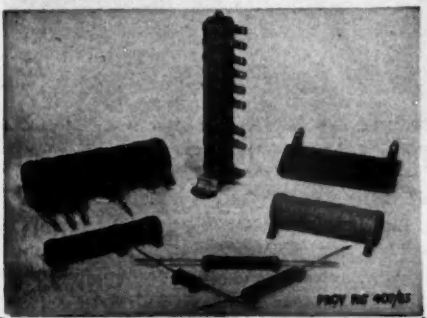

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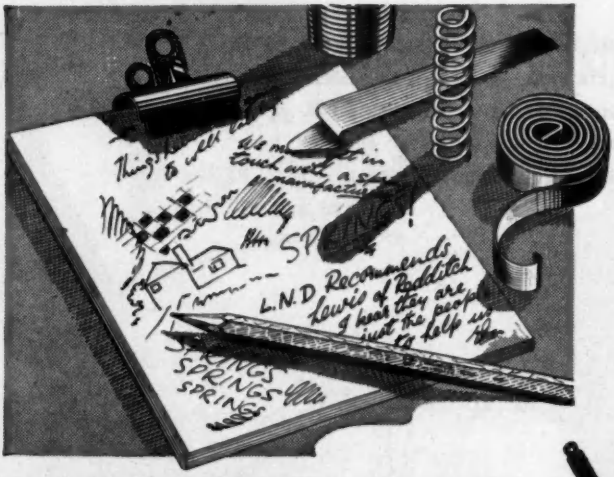

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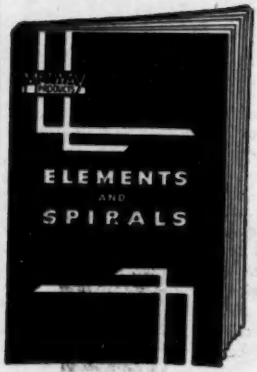

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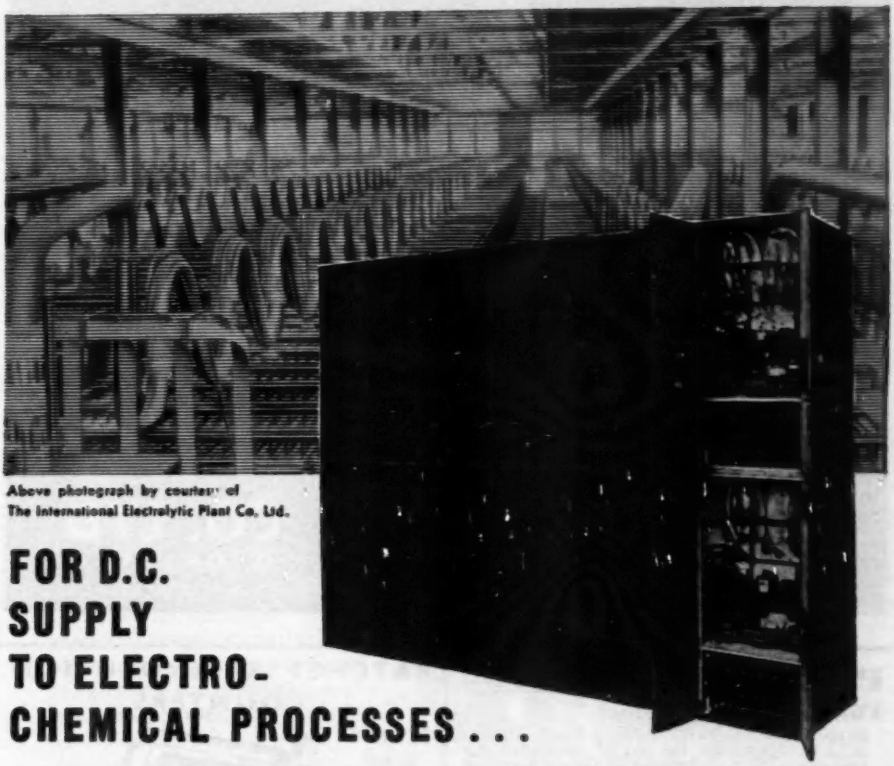

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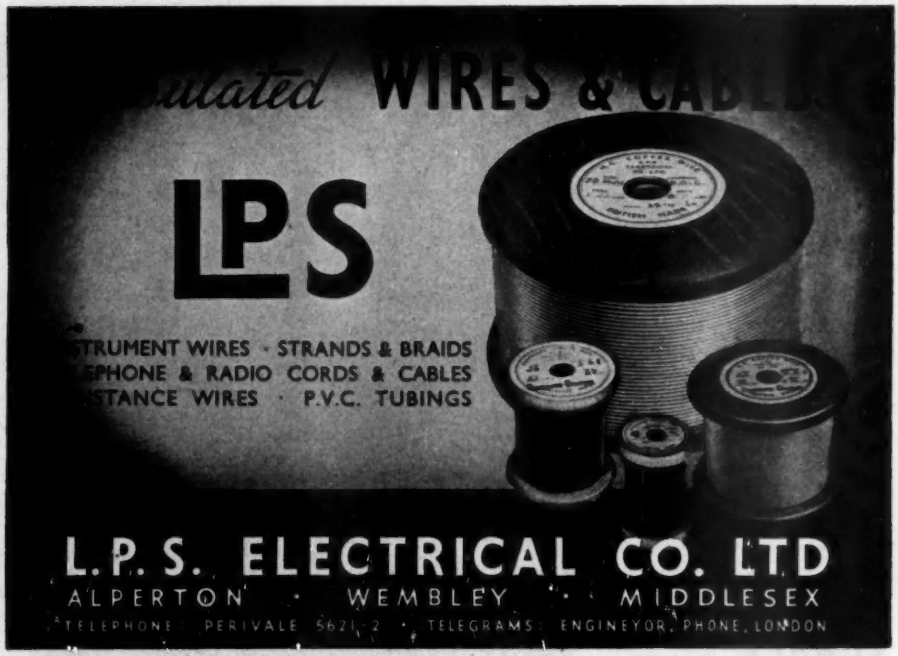
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